

**DISTINGUISHING BETWEEN PEDIATRIC ANXIETY AND DEPRESSION:
THE EXPERIENCE OF EMOTION AND EMOTION REGULATION**

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Anxiety and depression, two common disorders in childhood and adolescence, are highly comorbid. However, while the majority of depressed youth have a past history or current diagnosis of anxiety, only one third of anxious youth have experienced depression. To elucidate the substantial, but incomplete overlap between these disorders, this study sought to determine whether youth with clinical diagnoses of depression and anxiety could be differentiated based on features of emotion and emotion regulation. To achieve this, this study utilized ecological momentary assessment (EMA) data to examine youth's experience of and response to negative emotions in real-life. The sample included 165 nine to 14 year-olds: 27 with diagnoses of depression (DEP), 76 with diagnoses of Generalized Anxiety Disorder (ANX), and 62 healthy controls (CON). None of the participants in the ANX group had diagnoses of depression, while 37% of participants in the DEP group had secondary diagnoses of anxiety. Over a 5 day block, participants received phone calls in which they were asked to identify recent events that elicited negative emotions, provide ratings of negative emotions, and report on how they handled these emotions. Hypotheses were tested using both categorical groups (DEP, ANX, CON) and continuous indices of depressive and anxious symptoms to examine the contribution of depressive symptoms above and beyond anxious symptoms (and vice versa). Using either approach, findings indicated that depression was uniquely linked with greater peak sadness and higher levels of rumination, while anxiety was uniquely related to greater peak nervousness and

higher levels of worry. While more tenuous, findings supported aspects of emotion regulation as shared features (e.g., higher rumination, lower effortful control, greater mean intensity of worry). In sum, this study lends support to anxiety and depression being different manifestations of similar underlying phenomena with respect to how youth experience and respond to negative emotions.

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PREFACE

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1.0 INTRODUCTION

Anxiety and depression are common psychological disorders in childhood and adolescence; each has a predicted lifetime prevalence of approximately 10% in childhood (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003), with depression rates found to be as high as 24% in older adolescents (Lewinsohn, Rohde, & Seeley, 1998). These disorders are also highly comorbid. Strikingly, children who meet criteria for one disorder are 25-29 times more likely to also meet criteria for the other (Costello et al., 2003). Further, there is a high degree of co-occurrence *across* childhood, with anxiety commonly preceding the development of depression (Costello et al., 2003; Kessler, Avenevoli, & Merikangas, 2001). Notably, anxious children are 8-29 times more likely to develop depression than their non-anxious peers (Rapee, Schniering, & Hudson, 2009), with approximately 75% of depressed youth also having met criteria for an anxiety disorder (Avenevoli, Stolar, Li, Dierker, & Merikangas, 2001; Kessler et al., 2001).

The frequent co-occurrence of anxiety and depression has led some researchers to hypothesize that anxiety and depression may be different manifestations of the same disorder. Indeed, there is significant genetic overlap between anxiety during childhood and later onset of depression (Rice, van den Bree, & Thaper, 2004; Silberg, Rutter, & Eaves, 2001). Furthermore, population twin studies indicate that most of the covariation between anxiety and depression is due to shared genetics (Eley & Stevenson, 1999; Thaper & McGuffin, 1997). Taken together, the high degree of comorbidity and the substantial genetic overlap suggest that anxiety and

depression are different manifestations of similar underlying phenomena. This is supported by work by Blanco et al. (2014), which found evidence for a two-factor model in adults, with one factor common to GAD and MDD. The authors found support for a second factor that mapped specifically onto GAD. In contrast, they did not find support for a factor specific to MDD, indicating that MDD and GAD are highly related.

Yet the *Diagnostic and Statistical Manual for Mental Disorders* (DSM-5; American Psychiatric Association [APA], 2013), considers anxiety and depression to be distinct, with a separate set of diagnostic criteria for each disorder. Further, although the DSM recognizes that generalized anxiety in particular is a “commonly associated feature” of depression, it precludes an individual from having a diagnosis of generalized anxiety if the presence of anxiety overlaps entirely with the occurrence of depression (APA, 2013, p. 225). Thus, the assumption is that these two disorders are clinically different.

Moreover, treatment differs for anxiety and depression. While both disorders are typically treated with cognitive-behavioral therapy (CBT) and/or selective serotonin reuptake inhibitors (SSRIs; Axelson & Birmaher, 2001), the content of CBT differs for a child who is depressed relative to a child who is anxious, as treatment for depression focuses on negative attributions of events that have occurred, while treatment for anxiety typically involves concern over future events (Kendall, Kortlander, Chansky, & Brady, 1992). Treating a child with anxiety generally involves following a gradual exposure hierarchy, where the child slowly masters coping with anxiety-inducing situations. Alternatively, treating depression typically does not entail graduated exposures; instead, the focus is on decreasing depressogenic thoughts (Kendall et al., 1992).

Thus, there is a disconnect between evidence suggesting that anxiety and depression are highly similar (e.g., genetic data, comorbidity rates) and the approach to diagnosis and treatment of clinical manifestations of anxiety and depression. Examining the phenomenology of the clinical presentation of ‘pure’ cases of these disorders (i.e., anxiety without co-occurring depression and vice versa) provides an opportunity to clarify the relationship between anxiety and depression in children and adolescents. To this end, the purpose of this project was to contrast the experience of youth with diagnoses of anxiety to those with diagnoses of depression in order to examine whether aspects of emotionality and emotion regulation can distinguish between these two groups. To achieve this, we examined youth’s report of their everyday experiences with emotions in a sample who met DSM-IV diagnostic criteria for Major Depressive Disorder (MDD) or Generalized Anxiety Disorder (GAD), as well as a group of youth who did not meet diagnostic criteria for any psychopathology (i.e., healthy controls).

There are several reasons for looking specifically at the comorbidity between MDD and GAD. First, GAD has a higher degree of comorbidity with depression than other anxiety disorders. For example, in one high-risk family study, youth with depressive disorders (including both MDD and dysthymia) were 10.3 times more likely to also have GAD (Avenevoli et al., 2001) than youths without depressive disorders. This number is even higher if one does not apply the DSM-IV rule that evidence must be shown for the episode of GAD to have occurred outside the episode of MDD (Noyes, 2001). Additionally, Lahey et al.’s (2008) factor analysis of all DSM-IV internalizing symptoms concluded that both caretaker- and youth-reported symptoms of sadness and worry loaded onto a factor that combined MDD/GAD and social factors, and were distinct from other anxieties, including fears and obsessive compulsive disorder. Using a similar methodology, Price et al. (2013) also found support that anxiety and depression loaded onto

distinct factors; however, this factor structure fit better when considering youth who were age 11 or older. Taken together, examining the overlap between GAD and MDD offers a good starting point to delineating common and specific features of anxiety and depression. However, it is important to note that many of the studies discussed below will be based on samples of youth who experience a variety of anxiety disorders, as researchers often use a broader definition of anxiety. Whenever possible, we will note studies whose findings focus exclusively on individuals with GAD.

1.1 DEVELOPMENTAL CONSIDERATIONS

The transition to adolescence offers an opportune time to study the comorbidity between anxiety and depression. The incidence of anxiety and depression increases during this developmental period, in particular for females (Angold, Costello, & Worthman, 1998; Cyranowski, Frank, Young, & Sheer, 2000; Van Oort, Greaves-Lord, Verhulst, Ormel, & Huizink, 2009). Youth who develop psychiatric disorders at this stage of life are more likely to be impaired by anxiety and depression in adulthood, implying that adolescence is a critical period of development that has major implications for psychiatric functioning in later life. One marker of the transition to adolescence is the onset of puberty, which is considered a sensitive period in development (Reardon, Leen-Feldner, & Hayward, 2009) due to maturation across multiple domains, including physical, cognitive, neurological, and emotional spheres.

Pubertal maturation is also associated with changes in processing of emotional information (e.g., Forbes, Phillips, Ryan, & Dahl, 2011; Silk et al., 2009) in healthy youth, including increased intensity of emotions (Dahl, 2004). Accordingly, several studies show

positive associations between puberty and rates of anxiety and depression in females (Angold et al., 1998; Deardoff et al., 2007; Joinson et al., 2012; Patton et al., 2008; Reardon et al., 2009), which may be due to increased emotional reactivity and related difficulty modulating high intensity emotions (Dahl, 2004). Indeed, emerging evidence suggests that increased reports of negative emotions seen in depressed youth are magnified by pubertal status (Silk et al., 2011). With this in mind, the current paper focuses on the period of middle childhood to emerging adolescence to capture the transition to puberty and its heightened effects on emotional development.

1.2 SIGNIFICANCE OF THE CURRENT PROJECT

Determining shared and unique features of anxiety and depression will improve our theoretical understanding of these constructs. In the past few years, several models have been suggested to understand the overlap between anxiety and depression. Cohen, Young, Hankin, Gibb, & Abela (2014) propose a model where early anxiety interacts with cognitive vulnerabilities to increase development of depression, supporting the distinction between these diagnoses. Their model was supported when examining anxious and depressive symptoms in a community sample of youth. Relatedly, Cummings, Caporino, and Kendall (2013) find support for a model in which anxiety leads to development of depression, suggesting a similar vulnerability model. However, they suggest that this model is specific to separation anxiety and social anxiety. In contrast, the overlap between GAD and depression is better accounted for by a model that indicates concurrent comorbidity; this latter study supports a shared diathesis, rather than implying that GAD increases vulnerability to subsequent MDD.

High rates of comorbidity between anxiety and depression may be partially attributed to overlap in diagnostic criteria. Notably, both disorders are characterized by fatigue, sleep disturbance, difficulty concentrating, and irritability (Axelson & Birmaher, 2001). It is not surprising that there is a moderate to high correlation between self-report measures of anxiety and depression (r 's between .50 and .70; Stark & Laurent, 2001) because self-report measures of anxiety and depression, such as the Children's Depression Inventory (CDI) and the Revised Children's Manifest Anxiety Scale (RCMAS) currently include both overlapping and identical items (Stark & Laurent, 2001). While the DSM-5 has added the option to specify if an individual's depression is "with anxious distress," it continues to preclude the diagnosis of GAD if only evident during the same time an individual meets criteria for MDD (APA, 2013, p. 184). Additionally, the DSM-5 continues to include irritable mood, sleep disturbance, fatigue, and difficulty concentrating as symptoms in the diagnostic criteria of both disorders. If we can better distinguish between anxiety and depression based on unique features, we may be able to improve the diagnostic assessment of these disorders.

In addition to aiding diagnosis, there are significant treatment implications that may result from being able to more clearly disentangle anxiety from depression. A recent treatment outcome study suggests that CBT has different efficacy for anxiety and depression in certain populations. Kendall and colleagues (2004) found that anxious (GAD, social, separation) 9- to 13-year-olds who received CBT tailored for anxiety, continued to be largely asymptomatic 7.4 years later, while the treatment did not reduce the future occurrence of depression (Kendall, Safford, Flannery-Schroeder, & Webb, 2004). Thus, a better understanding of shared and distinct characteristics could help clinicians identify foci of treatment for children with comorbid anxiety and depression (e.g., Joiner & Lonigan, 2000). Furthermore, given the tendency for childhood

depression and anxiety to persist into adolescence (Avenevoli, et al., 2001; Costello et al., 2003; Keller et al., 1992; Orvaschel, Lewinsohn, & Seeley, 1995) and adulthood (Kessler et al., 2001), effective interventions early in life have the potential to improve health over the lifespan and have tremendous economic impact to society. Depression is currently considered the most costly disease to society, surpassing all other psychological and physical illnesses (Usten, Ayso-Mateos, Chatterji, Mathers, & Murray, 2004).

1.3 DEFINING KEY TERMS: EMOTION AND EMOTION REGULATION

Both anxiety and depression can be construed as disorders of emotionality and emotion regulation (Mennin, Heimberg, Turk & Fresco, 2005; Steinberg & Avenevoli, 2000). Emotions include subjective feelings and serve to motivate individuals towards action (Cicchetti, Ackerman, & Izard, 1995). Both anxiety and depression involve heightened levels of negative emotions, including fear, sadness, and irritability. These negative emotions are experienced with greater intensity and frequency compared to healthy youth (Silk et al., 2011; Tortela-Feliu, Balle, & Sese, 2010). While these feeling states in and of themselves are not maladaptive, and indeed can even be adaptive in certain circumstances (Cicchetti et al. 1995), when combined with difficulty managing these negative feelings, experiencing heightened emotionality becomes problematic (Steinberg & Avenevoli, 2000).

In other words, anxious and depressed youth display poor emotion regulation, which includes “the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals” (Thompson, 1994, p. 27-28). While various definitions of emotion regulation exist,

emotion regulation generally encompasses strategies to increase or decrease the current emotional state (Cicchetti et al., 1995). One way of conceptualizing anxiety and depression is that individuals with these disorders exhibit both a greater degree of negative emotion and increased difficulty handling this emotion (Cicchetti et al., 1995; Mennin et al., 2005; Steinberg & Avenevoli, 2000).

1.4 EMOTION AND EMOTION REGULATION AS A MEANS OF UNDERSTANDING THE RELATIONSHIP BETWEEN ANXIETY AND DEPRESSION

Given this framework, one approach to improving our understanding of the relationship between anxiety and depression is to descriptively study youth's experience of negative emotion and the types of emotion regulation strategies utilized to cope with their negative emotions. The study of emotion and emotion regulation offers the opportunity to elucidate our understanding of the substantial, but incomplete, overlap between childhood anxiety and depression. To this end, the current study examined shared and unique features of global aspects of emotionality, discrete emotions, and the context of negative emotions. We also considered whether anxious and depressed youth utilize different emotion regulation strategies when faced with a negative experience. We first present an overview of each of these components of emotionality and emotion regulation and then review background literature on differential associations between emotionality and emotion regulation and anxiety and depression.

Child temperament, defined as individual differences in personality dispositions (Clark & Watson, 1991), has been conceptualized as one means to understand the overlap between anxiety and depression. The tripartite model, developed by Clark and Watson (1991), offers an

explanation for the overlap between anxiety and depression in adulthood using three trait-like components: negative affect, positive affect, and physiological hyperarousal. This model has also been extended to the understanding of child anxiety and depression, and we employ it as a means of differentiating between the two disorders.

In addition to examining associations between global aspects of emotionality and anxiety and depression, it is worthwhile to explore links between discrete emotions and diagnosis. While some have argued that these two approaches are at odds with each other, Izard (2011) suggests that they provide unique and complementary information. Recent findings utilizing experience sampling methods, which capture individuals' emotions during daily life, support the importance of including both approaches. For example, Adam (2006) demonstrated that while both state and trait measures of anger were associated with cortisol levels, only state anxiety (not trait) was associated with cortisol activity in healthy adolescents. Additionally, several studies indicate that depressive symptoms and MDD are associated with experiencing greater emotional lability (i.e., greater fluctuation in mood; Larson, Raffaelli, Richards, Ham, & Jewel, 1990; Silk, Steinberg, & Sheffield Morris, 2003; Silk et al., 2011), including greater intensity and lability of anger and nervousness in association with depression. By examining emotions associated with specific negative experiences, we can identify whether there are other ways to understand the incomplete overlap between anxiety and depression. We have focused on the negative emotions of anger, sadness, and nervousness, as these emotions have been linked to anxiety and/or depression.

Along with examining the type of negative emotion experienced, we can also explore the environmental context in which this emotion is elicited. Indeed, both anxious and depressive symptoms have been linked to the recent experience of greater daily hassles, in particular for youth who are high on negative affect (Fox, Halpern, Ryan, & Lowe, 2010). In other words,

context can perpetuate one's mood. Importantly, this is not to say that depressed or anxious youth necessarily experience more stressful events than non-affected peers. Indeed, healthy youth also report experiencing stressors; these problems commonly fall into several categories, including school, family, and friends (Spirito, Spark, Grace, & Stamoulis, 1991; Stark, Spirito, Williams, & Guevremont, 1989). Instead, the difference between afflicted and non-afflicted youth may be in their perceptions of situations. For example, anxious youth have been shown to demonstrate interpretation biases of ambiguous situations in both community (Bell-Dolan, 1995; Chorpita, Albano, & Barlow, 1996; Hadwin, Frost, French, & Winters, 1997; Muris, Meesters, & Rombelberg, 2006; Muris, Merckelbach, & Damsma, 2000; Suarez & Bell-Dolan, 2001) and clinical samples (Creswell, Schniering, & Rapee, 2005; Gifford, Reynolds, Bell, & Wilson, 2008; Taghavi, Moradi, Neshat-Doost, Yule, & Dalgleish, 2000), where they exhibit a heightened perception of threat. Alternatively, depressed youth exhibit memory biases favoring more negative views of situations in community (Bishop, Dalgleish, & Yule, 2004) and clinical samples (Park, Goodyer, & Teasdale, 2002). While the DSM-5 (APA, 2013) indicates that youth with GAD worry about performance, and both interview and self-report measures of GAD ask questions about the content of worry (e.g., Anxiety Disorders Interview Schedule for Children for DSM-IV, Silverman & Albano, 1996; Worry and Anxiety Questionnaire, Laugesen, Dugas, & Bukowski, 20003) to our knowledge, there has not been research to systematically examine whether different contexts cause anxious and depressed youth to be distressed or upset. Yet, it seems plausible that different situations may be more upsetting to anxious youth than depressed youth, and vice versa.

Finally, after considering how emotionality and the context of negative emotions play into anxiety and depression, we discuss potential distinguishing features of emotion regulation. The specific emotion regulation strategies will be defined later in the document.

1.5 A THEORETICAL PERSPECTIVE

Although it is difficult to differentiate anxiety from depression, there are several areas where there is a theoretical rationale for expecting emotionality and the use of emotion regulation strategies to differ between these two disorders. Beck's cognitive content model of depression (1967, 1976) suggests that individuals differ in their maladaptive schemas based on the type of disorder they have, with depressive individuals' thoughts focusing on loss and failure, while anxious individuals' thoughts center on danger, harm, and uncertainty (Beck, 1967, 1976). The content of these thoughts in turn relates to the accompanying emotions that an individual experiences (Beck, 1967, 1976). For example, depressive cognitions generate feelings of sadness, guilt, and disappointment, whereas anxious thoughts induce fear and anxiety, defined as "the unpleasant feeling state and physiological reaction that occurs when fear is provoked" (Beck, 1976, p. 138). Izard's Differential Emotions Theory (1972, 1977) echoes the idea that fear and sadness are the predominant emotions in anxiety and depression, respectively. Although both negative, feeling nervous is associated with higher levels of arousal than feeling sad (i.e., more activating; Posner, Russell, & Peterson, 2005; Russell, 1980).

In addition to differences in discrete emotions, Clark and Watson (1991) have suggested that anxious and depressed individuals differ in trait measures of emotionality. The tripartite model suggests that high levels of negative affect, or the propensity to experience negative

emotions such as fear or sadness, characterize both anxiety and depression. Thus, negative affect is thought to explain the high degree of overlap between the two disorders. In contrast, high levels of physiological hyperarousal, or somatic symptoms, are posited to be specific to anxiety. Lastly, low levels of positive affect, the tendency to experience positive emotions, has been theorized to be uniquely associated with depression (Clark & Watson, 1991). While Clark and Watson's model was initially developed to explain anxiety and depression in adults, their work has since been extended to the study of these disorders in childhood, albeit mostly in community samples of youth. Notably, Beck's theory also supports the role of low positive affect in depression: depressed individuals are more likely to have cognitive schemas focusing on negative, rather than positive, information (Beck & Emory, 1985), which further supports the supposition that the propensity to experience positive emotions is reduced in depressed individuals.

Extending Beck's theory of the specificity of cognitive content, it seems plausible that different types of events would trigger anxious rather than depressed thoughts and feelings. Indeed, Beck (1976) mentions several situations that should lead to feeling anxious, including concerns about health and safety. Conversely, events considered to be a loss, including disappointment, should result in feeling depressed. Complementing Beck's work, Izard's Differential Emotions Theory (1972, 1977) also discusses how different types of situations lead to distinct emotions, reiterating that loss and failure should induce feelings of sadness while threat and danger should result in fear.

Finally, individuals can be expected to respond differently to feelings of anxiety and depression. Indeed, Kendall and Ingram (1989) surmise that anxious thoughts often take the form of questions, with a focus on the future, whereas depressive thoughts tend to be declarative

statements, with an emphasis on the past. Thus, it follows that anxious individuals would have a greater tendency to worry – questioning potential negative outcomes – while depressed individuals would be more likely to ruminate – focusing on negative, foregone conclusions. An additional emotion regulation strategy that may distinguish responses to anxiety and depression is avoidance. Anxious individuals are avoidant to keep from facing potentially threatening situations. Depressed individuals, on the other hand, refrain from daily activities, as a function of having given up on their future (Beck & Emery, 1985). The latter may be viewed more as hopelessness than avoidance.

With this theoretical perspective in mind, the next sections of this paper review studies of the specific areas of emotion and emotion regulation that may elucidate the relationship between anxiety and depression, including aspects of global and discrete emotionality, the context of negative events, and the emotion regulation strategies youth employ when facing a negative experience. We first explore ways we expect the experience of emotion to be unique to depression and then discuss ways we expect it to be unique to anxiety. Lastly, we highlight the ways in which emotion and emotion regulation would be expected to be similar across disorders. The literature reviewed focuses on studies of children and adolescents. Many samples consist of youth who fall into a large age range (e.g., 6-18); as such, we specify when findings are specific to a certain age (e.g., results drawn from samples with narrower age ranges).

1.6 EXPERIENCES OF EMOTIONALITY THAT MAY BE UNIQUE TO DEPRESSION

1.6.1 Global emotionality: Positive affect.

Clark and Watson (1991) theorize that low levels of positive affect (PA), the tendency to experience positive emotions, are uniquely associated with depression. Indeed, there is research indicating that lower levels of PA are associated with higher levels of depressive, but not anxious, symptoms in both community (Cannon & Weems, 2006; Chorpita, 2002; Fox et al., 2010; Lonigan, Phillips, & Hooe, 2003) and clinical samples (Joiner, Catanzaro, & Laurent, 1996). However, there is also some evidence suggesting that PA is related to both anxiety and depressive disorders in community (Jacques & Mash, 2004; Lonigan, Hooe, David, & Kistner, 1999) and clinical samples (Joiner, Blalock, & Wagner, 1999), although this was only true for girls in Joiner et al.'s (1999) sample. Relatedly, Cannon and Weems (2006) found that levels of PA did not differentiate between children with anxious symptoms and children with both anxious and depressive symptoms, suggesting that low PA may be associated with common features of both disorders. On the other hand, two studies found that PA was specific to, or more strongly related to, depressive symptoms, but only in children ages 12 or older (Cole, Truglio, & Peeke, 1997; Lonigan et al., 1999). As the majority of research to date has focused on community samples, it will be important to clarify in a clinical sample whether low PA is uniquely related to depression in youth.

1.6.2 Discrete emotions: Sadness.

A core feature of depression is experiencing depressed mood, “most of the day, nearly every day” (APA, 2013, p. 160), with sad mood predicting which adolescents will develop MDD over and above the presence of other depressive symptoms (Georgiades, Lewinsohn, Monroe, & Seeley, 2006). However, while sadness is clearly associated with depression, there is little evidence to determine if sadness is also associated with anxiety. Yet, Tan et al. (2011) recently demonstrated that while anxious and non-anxious youth did not differ on current ratings of sadness, anxious youth did report significantly higher levels of sadness associated with a recent negative experience (e.g., peak affect) than non-anxious youth. Additionally, Henker et al. (2002) demonstrated that adolescents with higher levels of anxiety were 11 times more likely to report sadness than adolescents with lower levels of anxiety (Henker, Whalen, Jamner, & Delfino, 2002). This preliminary evidence supports an association between sadness and anxiety; however, as this area has been understudied, further research is needed to determine whether levels of sadness differentiate between clinically anxious and depressed youth.

1.6.3 Context of negative emotions.

Moreover, there are reasons to believe that certain contexts would be more salient to individuals who are depressed. For example, as anhedonia is a core feature of MDD (APA, 2013), depressed youth likely experience more boredom. Likewise, social withdrawal is another common feature of the disorder, suggesting that depressed youth might report more experiences associated with loneliness. Finally, experiencing grief or loss, is also likely specific to depression. Indeed, Clark and Beck (1989) have theorized that depression in adults is related to loss (as cited by Lerner et

al., 1999), and Lerner et al. (1999) have shown that depressive symptoms are related to loss, albeit in a sample of anxious youth. The association between loss and depression is also supported in the adult literature, with Kessler, Davis, and Kendler (1997) demonstrating that parental separation or divorce during childhood predicts the onset of adult depression, and not GAD, when controlling for sociodemographic variables and prior disorders.

1.7 EXPERIENCES OF EMOTIONALITY THAT MAY BE UNIQUE TO ANXIETY

1.7.1 Global emotionality: Physiological hyperarousal.

Clark and Watson (1991) suggest that physiological hyperarousal, or somatic symptoms, are specific to anxiety. Consistent with the tripartite model, the DSM-5 includes somatic symptoms such as muscle tension, sweating, and nausea, as associated features of GAD. Yet, physiological hyperarousal has been less studied than the other two components of the tripartite model, with conflicting findings. In a community sample, Jaques and Mash (2004) found evidence suggesting that physiological hyperarousal was related to both anxious and depressive symptoms. However, in a study by Suveg and colleagues (2009) using a community sample, somatic responses to negative emotions were specific to anxious, and not depressive, symptoms (Suveg, Hoffman, Zeman, & Thomassin, 2009). Support for the latter finding has also been found in a clinical sample of anxious youth, with anxious youth reporting more frequent somatic responses to negative events than controls (Tan et al., 2011). However, this sample did not examine depressive symptoms, so we cannot ascertain the specificity of the relationship between physiological hyperarousal and diagnosis. Conversely, in another clinic sample, Chorpita,

Plummer, and Moffitt (2000) did not find significant associations between physiological hyperarousal and either GAD or depression. Instead, the authors found that high physiological hyperarousal was associated specifically with panic symptoms (Chorpita et al, 2000); this finding makes sense, as a diagnosis of panic includes experiencing multiple somatic symptoms. Based on the mixed evidence to date, it will be important to further elucidate whether physiological hyperarousal is uniquely associated with anxiety.

1.7.2 Discrete emotions: Fear/Nervousness.

While sadness is a core feature of depression, fear is considered a main component of anxiety. In particular, GAD is marked by excessive levels of nervousness and worry, which is defined as “apprehensive expectation” (i.e., related to fear) by the DSM-IV (APA, 2013, p. 222). Unlike other anxiety disorders, GAD encompasses individuals who experience anxiety about several issues, such as performance, finances, and health concerns, and has been linked to high perceptions of threat (Rapee, 1991).

While we know fear and nervousness are associated with anxiety, the relationship between fear and depression is more tenuous. Silk et al. (2011) revealed that in addition to heightened levels of sadness, depressed youth reported more nervousness than healthy controls. Additionally, Blumberg & Izard (1985) showed that in healthy 10- and 11-year-old females, depressive symptoms were positively associated with fear. However, more research is warranted to identify whether nervousness is truly unique to anxiety.

1.7.3 Context of negative emotions.

Individuals with GAD worry excessively about certain topics. Worry, a core feature of GAD, has been theorized to be linked with intolerance of uncertainty (Dugas, Gagnon, Ladouceur, & Freeston, 1998). Indeed, Laugesen et al. (2003) found that intolerance of uncertainty was associated with worry in a community sample of older adolescents. Intolerance of uncertainty can be linked with fear of the future, another area that has been shown specific associations with anxiety symptoms (Ronan, Kendall, & Rowe, 1994). Thus, it is likely that youth with GAD will report more negative events involving the future, including health concerns (Craske, Rapee, Jackel, & Barlow, 1989), danger (Lerner et al., 1999; Rapee, 1991), world events, and time (e.g., being late). Each of these topics reflects an area of concern that is not typically associated with other types of anxiety or with other types of psychopathology.

1.8 EXPERIENCES OF EMOTIONALITY LIKELY COMMON TO BOTH ANXIETY AND DEPRESSION

1.8.1 Global emotionality: Negative affect.

Clark and Watson's (1991) tripartite model suggests that high levels of negative affect, or the propensity to experience negative emotions such as fear or sadness, characterize both anxiety and depression. Thus, negative affect is thought to explain the high degree of overlap between the two disorders. Extant research findings largely support a shared association between high levels of negative affect and both anxious and depressive symptoms (Cannon & Weems, 2006;

Chorpita, 2002; Jaques & Mash, 2004; Lonigan et al., 1999; Lonigan et al., 2003; Suveg et al., 2009; for an exception see Mor et al., 2010). This finding is further corroborated by studies that have looked at only depression or anxiety. Namely, Verstraeten, Vasey, Raes, and Bijttebier (2009) found positive associations between negative affect and depressive symptoms in adolescents, and Anderson, Veed, Inderbitzen-Nolan, and Hansen (2010) and Lonigan and Vasey (2009) both found positive associations between negative affect and anxious symptoms in late childhood and adolescence.

The few studies that have examined higher levels of negative affect in clinical samples (i.e., youth who meet full diagnostic criteria and suffer impairment from their symptoms) generally have found support for its shared association with anxiety and depression (Greene, Chorpita, & Austin, 2009; Joiner et al., 1996; Joiner & Lonigan, 2000). In particular, Green et al. (2009) replicated this finding in a sample that specifically looked at GAD, as opposed to a more general index of anxiety. Importantly, while Chorpita et al. (2000) found evidence supporting negative affect as a feature of some types of anxiety, including GAD, in a clinical sample, they defined negative affect through measures that are meant to assess anxious and depressive symptoms (i.e., Revised Children's Manifest Anxiety Scale, Children's Depression Inventory); thus, their finding may be better explained by shared-measurement variance. Overall, while extant research largely supports negative affect as a shared feature, more studies are needed to confirm this finding in a clinical sample of youth.

1.8.2 Discrete emotions: Anger/Irritability.

A potential shared feature of anxiety and depression in youth is irritability, or levels of anger. Irritability is an associated feature of GAD (APA, 2013) and can be one of the core criteria for

MDD, particularly for children and adolescents (APA, 2013). Research findings support this similarity. In a sample of 10- and 11-year-olds, depressive symptoms were positively correlated with self-report levels of anger (Blumberg & Izard, 1985) and daily ratings of irritation were correlated with both anxious ($r = .37$) and depressed ($r = .42$) mood in 11- to 14-year-old healthy adolescents (Schneiders et al., 2007). Further, Zeman, Shipman, and Suveg (2002) found that the inappropriate expression of anger was positively associated with internalizing scores in a community sample of older children (mean age = 10). Additionally, children with elevated levels of anxiety (Henker et al., 2002), including those with anxiety disorders (Suveg & Zeman, 2004) report more intense anger than controls, as do adolescents with depressive symptoms (Silk et al., 2003) and youth with MDD (Silk et al., 2011). Greater irritability also distinguishes between youth with GAD from youth with other anxiety disorders (Pina, Silverman, Alfano, & Saavedra, 2002). Taken together, there is some evidence indicating associations between anger and anxiety or depression; however, no studies to date have directly compared anxious and depressed youths' experience of anger when upset to assess whether there are differences in peak levels of anger.

1.8.3 Context of negative emotions.

While this area has not been well-researched, we anticipated that anxious and depressed youth would report similar levels of concerns regarding school, family, and peers, as interpersonal and achievement concerns are theorized to be present in both anxiety and depression (Allen et al., 2006; Hammen, Shih, & Brennan, 2004; Silverman, La Greca, & Wasserstein, 1995; Sontag, Graber, Brooks-Gunn, & Warren, 2008). For instance, anxious youth demonstrate attentional biases towards threatening faces (Gamble & Rapee, 2009). Youth with GAD also show an attentional bias towards social threat words (Taghavi, Neshat-Doost, Moradi, Yule, & Dagleish,

1999). Depression has also been linked to interpersonal stress, including social rejection (Allen & Badcock, 2003) and, for older adolescents, romantic breakups (Brown & Harris, 1989; Lewinsohn, Allen, Seeley, & Gotlib, 1999). Thus, while both types of youth might have greater levels of concerns regarding school, family, and peers than healthy youth, there is no reason to expect these types of concerns to differentiate anxious from depressed youth.

1.9 EMOTION REGULATION

Having discussed similarities and differences in how global affect and discrete negative emotions may relate to anxiety and depression as well as having hypothesized how different types of events may precede feeling anxious or depressed, we now turn to a discussion of emotion regulation, i.e., the ways in which an individual handles his or her feelings. First, we discuss effortful control, a temperament trait that has been theorized to be a feature of emotion regulation. Then we focus on different types of emotion regulation strategies and how they might help us to distinguish between anxiety and depression.

1.9.1 Effortful control

Effortful control is a component of temperament defined as the ability to inhibit a dominant response to produce a non-dominant response (Rothbart, Ahadi, Hershey, & Fisher, 2001; Rothbart & Bates, 1998). Effortful control includes the lower-order traits of attention, inhibitory control, achievement motivation, and organization (Shiner & Caspi, 2003). Eisenberg and Spinrad (2004) posit that effortful control is a component of voluntary emotion regulation.

Relatedly, in a community sample, they found healthy 4- to 8-year-old children demonstrate higher levels of attentional control than children marked as high on the internalizing symptoms scale on the CBCL (Eisenberg et al., 2001), and suggest that this component of EC may help individuals to shift focus away from negative information (Eisenberg, Spinrad, & Eggum, 2010). Low levels of effortful control are shown to be associated with higher levels of anxious (Lonigan & Vasey, 2009; Vervoot et al., 2011) and depressive symptoms (Loukas & Robinson, 2004; Loukas & Roalson, 2006; Verstraeten et al., 2009; Yap et al., 2011) in middle childhood and adolescence. Only two studies have examined whether effortful control differentiates between anxious and depressive symptoms in children; both of these studies specifically examined the attentional control subcomponent of effortful control, which measures the ability to focus and shift attention. Of these studies, one found that lower levels of youth-reported attentional control were associated with higher levels of both anxious and depressive symptoms (Muris et al., 2006), while the other found that lower levels of attention control were associated with higher levels of depressive, but not anxious, symptoms (Helzer, Connor-Smith, & Reed, 2009). The two studies utilized nearly identical samples and designs, making it unclear what may have accounted for their differing findings. Clearly more research is warranted to delineate whether effortful control is differentially related to anxiety and depression. Importantly, to date no studies have utilized a clinical sample, limiting our ability to conclude whether lower effortful control also characterizes youth who are clinically ill.

1.10 EMOTION REGULATION STRATEGIES

Both youth with anxious and depressive symptoms demonstrate less adaptive coping with negative emotions compared to those without symptoms (Suveg et al., 2009; Suveg & Zeman, 2004). Emerging evidence suggests that it may not be a lack of understanding of more adaptive coping skills, but rather difficulty employing an appropriate strategy when facing distress (Tan et al., 2011). These strategy choices may differ for anxious and depressed youth; however, researchers have not yet explored this possibility.

1.11 EMOTION REGULATION STRATEGIES LINKED TO DEPRESSION

1.11.1 Rumination.

Nolen-Hoeksema, Wisco, and Lyubomirsky (2008) define rumination as the “process of thinking perseveratively about one’s feelings and problems,” including their causes and consequences (p. 400). Nolen-Hoeksema posited that rumination alone was not a risk factor for depression; rather, when in a negative mood, rumination could moderate affect by “enhanc[ing] the effects of depressed mood on thinking and behavior” (Nolen-Hoeksema et al., 2008, p. 401).

Rumination has generally been shown to be positively associated with current depressive symptoms (Abela, Parkinson, Stolorow, & Starrs, 2009; Hankin, 2008a; Lopez, Driscoll, & Kistner, 2009; Papadakis, Prince, Jones, & Strauman, 2006; Park, Goodyer, & Teasdale, 2004; Rood, Roelofs, Bogels, Nolen-Hoeksema, & Schouten, 2009; Verstraetem, Bijttebier, Vasey, & Raes, 2010) and depressive symptoms one year later (Roelofs et al., 2009; Rood et al., 2009;

Verstraetem et al., 2009; for an exception, see Park, Goodyer, & Teasdale, 2005). Peled and Moretti (2007) have further delineated the association between rumination and depressive symptoms, demonstrating that rumination on sadness, and not on anger, was related to increased depressive symptoms in a community sample of adolescents.

Studies that have directly examined differential associations of rumination with depression and anxiety in children and adolescents provide conflicting results regarding the specificity of rumination (Hankin, 2008a; Muris, Roelofs, Meesters, & Boomsma, 2004; Muris, Fokke, & Kwik, 2009; Roelofs et al., 2009). Muris et al. (2004) found that rumination remained associated with anxiety, after controlling for depression; whereas rumination was no longer associated with depression after controlling for anxiety, thus supporting specificity in the relationship between rumination and *anxiety*. Muris et al. (2009) also supported a specific association between rumination and anxiety in 12- to 15-year-olds, while rumination was linked with both anxiety and depression in 16- to 18-year-olds. Alternatively, Hankin (2008a) suggest that rumination is primarily associated with general internalizing symptoms, rather than with depression and anxiety specifically. Relatedly, Roelofs et al. (2009) found significant associations with both disorders, where rumination was related to increases in both depression and anxiety. Thus, there is some evidence that rumination is a factor common to both anxiety and depression. However, since most research to date has focused only on the association between rumination and depression, it is important to examine the specificity of this relationship further in a sample that includes both anxious and depressed youth.

1.12 EMOTION REGULATION STRATEGIES LINKED TO ANXIETY

1.12.1 Worry.

Worry is commonly defined as “a chain of thoughts and images, negatively affect-laden and relatively uncontrollable” (Borkovec, Robinson, Pruzinsky, & DePree, 1983, p. 10, as cited by Muris et al., 2004). Worry can be categorized as an unproductive and repetitive pattern of thinking (Muris et al., 2004) that can amplify and prolong negative affect (Hong, 2007) and interfere with problem-solving, in part due to associations with cognitive inflexibility (Nolen-Hoeksema et al., 2008). While in many ways worry is similar to rumination, there are two main distinctions. Generally, worry is focused on the future while rumination focuses on the past (Ingram & Kendall, 1987). In addition, ruminative thinking tends to take the form of declarative statements, whereas worry is in the form of questions (e.g., what ifs; Ingram & Kendall, 1987).

Although worry has long been considered to be a core feature of anxiety, recent research has examined whether there are unique associations between worry and depression in youth, after accounting for rumination. Muris et al. (2004), observed specific associations between worry and anxiety, but not worry and depression. Additionally, a greater number of worries is associated with higher anxiety, but not sadness (Dickson, Ciesla, & Reilly, 2012). These findings suggest that worry is specific to anxiety. However, using the same questionnaire as Muris et al. (2004), Rood, Roelofs, Bogels, and Alloy (2010) found that worry was equally related to both disorders. In a recent study of 9 to 13 year-olds, Verstraeten et al. (2011) also found a positive association between worry and both anxiety and depressive symptoms. Taken together, there is mixed evidence for unique associations between worry and anxiety. As this question has not yet been

examined in a clinical sample, it is important to assess the role of worry in youth with clinically significant levels of anxiety and depression.

1.12.2 Avoidance.

Anxiety is often linked with avoidance, purposefully staying away from situations that could induce fear or worry. Avoidance is thought to immediately reduce an individual's level of anxiety (by keeping him or her out of the stressful situation); however, avoidance is considered a maladaptive coping strategy because the individual does not learn mastery (i.e., that he or she can tolerate the anxiety-provoking situation) or ways to reduce anxiety once in the situation (i.e., adaptive coping strategies) and thus, continues to avoid similar situations in the future.

In addition to physical avoidance, Borkovec argues that worry can be construed as a means of cognitive avoidance (Borkovec, Shadick, & Hopkins, 1991; Laugesen et al., 2003). In the short-term, anxious individuals believe that worrying is helping them to solve the problem; however, in the long-term, worry simply perpetuates anxiety by taking time away from problem-solving and other more adaptive coping strategies.

Research supports links between anxiety and avoidance. For instance, Micco and Ehrenreich (2008) showed that anxious youth demonstrated greater avoidance responses to personally salient anxious situations than non-anxious youth. Youth with anxiety disorders are also more likely to respond to hypothetical threatening situations with avoidance than non-anxious youth (Barrett, Rapee, Dadds, & Ryan, 1996; Bell-Dolan, 1995). These findings are bolstered by studies of selective attention, which indicate that clinically anxious adolescents avoided looking at threatening faces (Gamble & Rapee, 2009) and were slower to name emotions when presented neutral versus happy faces (Benoit, McNally, Rapee, Gamble, &

Wiseman, 2007). Notably, there is one recent exception: Tan et al. (2011) did not find significant group differences in the use of avoidance in response to a recent negative event between anxious and non-anxious youth.

While several researchers have found positive associations between avoidance and internalizing problems, which encompass both anxiety and depression (Compas et al., 2006; Sontag & Graber, 2010), there are few studies that have examined links specifically between avoidance and depression. Of the studies that have looked for associations between avoidance and depression, avoidant coping styles have been related to greater depressive symptoms in non-clinical samples (Herman-Stahl, Stemmler, & Petersen, 1995; Sandler, Tein, & West, 1994). However, Herman-Stahl et al. (1995) did not measure anxiety symptoms, and Sandler et al. (1994) also found associations between avoidant coping and anxiety symptoms. The latter authors did not examine whether the relationship between avoidant coping and depressive symptoms was attenuated once controlling for anxious symptoms. Thus, neither study examines whether depression is linked with greater use of avoidance, or whether this relationship is driven by the high comorbidity between anxiety and depression. Additionally, while rumination may be considered a form of cognitive avoidance as *thinking* about one's problems detracts from *acting* to solve the problem (Nolen-Hoeksema, 1994; Nolen-Hoeksema et al., 2008), empirical findings do not fully support rumination as a form of avoidance (Giorgio et al., 2010). Taken together, further research is needed to determine whether avoidance is related to depression in clinical samples of youth.

1.13 EMOTION REGULATION STRATEGIES COMMON TO ANXIETY AND DEPRESSION

As reviewed above, research suggests that anxious and depressed youth are less likely than non-afflicted peers to utilize helpful emotion regulation strategies than non-afflicted peers, such as problem-solving, acceptance, distraction, and cognitive restructuring (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). For example, anxious youth reported using cognitive reappraisal less often than non-anxious youth (Carthy, Horesh, Apter, Edge, & Gross, 2010) and utilized ineffective strategies to regulate their emotions (Southam- Gerow & Kendall, 2000; Suveg et al., 2004). Similarly, depressed youth report less use of problem-solving and distraction than non-depressed youth (Garber, Braafladt, & Weiss, 1995; Garber, Braafladt, & Zeman 1991), and greater use of problem-solving is linked to higher rates of remission among adolescents with MDD (Dietz et al., 2014). While research has not yet begun to explore whether anxious and depressed youth differ in their use of these specific strategies, there is not a strong reason to expect them to differ in these specific coping skills beyond the expectation that they would both utilize adaptive strategies less than healthy, non-afflicted youth.

1.14 GAPS IN THE LITERATURE

While extant research has explored emotion and emotion regulation strategies in both anxious and depressed youth, we are currently limited in the conclusions we can draw about unique and shared associations between these factors and anxiety and depression. In large part, this is due to issues of sample selection and study design.

Most significantly, there are only a handful of studies that directly compare youth with anxiety to those with depression. By not including both depressed and anxious youth in the same sample, we limit our ability to directly draw conclusions about overlapping and unique features of emotion and emotion regulation. Another limitation of current studies has been the primary utilization of school and community samples. While such an approach allows for the collection of vast amounts of data and is indeed useful from a developmental psychopathology perspective, it precludes us from determining if these differences distinguish between individuals who meet diagnostic criteria for these disorders, i.e., youth who experience problems with family, school, and/or peers as a result of their symptoms. Thus, in addition to community samples, we need to recruit from clinical populations to develop a complete picture of which vulnerabilities confer risk for each disorder.

Further, as highlighted by the literature reviewed in this paper, many studies utilize samples that span a wide age range (e.g., ages 6 to 17). Including children, early adolescents, and late adolescents in the same sample could be limiting our ability to detect significant differences. This is of particular importance with respect to the study of temperament. While most studies do not report whether they examined the effects of age, a handful have found differences in the tripartite model based on participants' age (Chorpita, 2002; Jacques and Mash, 2004). Further, there is evidence that unique associations between rumination and depression differ based on age

(Muris et al., 2009). Therefore, it is important to have studies with samples that span a smaller age range or investigate the effects of age, as age may affect findings on shared and unique characteristics of anxiety and depression.

In addition to sample limitations, there are also issues in study methodology, primarily, the reliance on self-report measures. Most studies of negative affect, positive affect, and physiological hyperarousal have utilized self-report measures to assess both temperament and symptoms of anxiety and depression, which brings up issues of mono-method bias. A handful of studies have utilized diagnostic interviews to assess symptomatology, which allows for both child- and parent-report to be combined. However, as illustrated by questionnaire data, measures of both depression and anxiety often demonstrate weak convergent validity between parent and child reports (e.g., Cole et al., 1997). A newer approach has been to utilize ecological momentary assessment data (EMA), a type of experience sampling, to collect information on participants' mood. In addition to being less subject to recall bias, EMA data provide information on participants' behaviors in specific situations, thus offering a wealth of contextual information surrounding participants' current mood.

1.15 THE CURRENT STUDY

The purpose of this study was to elucidate common and unique factors for anxiety and depression through descriptively studying the experience of negative emotion in youth with clinical diagnoses of depression and anxiety (i.e., GAD). In addition to testing whether the tripartite model extended to youth with clinical levels of impairment, this study sought to identify whether anxious and depressed youth could be distinguished based upon discrete

negative emotions, the context of negative emotions, and the strategies employed to cope with negative emotions. The sample was composed of 9- to 14-year-olds with rigorously diagnosed clinically significant levels of dysfunction, as determined by interviewing parent and child using the Kiddie-Schedule for Affective Disorders and Schizophrenia (KSADS-PL; Kaufman, Birmaher, Brent, & Rao, 1997), which is considered the gold standard in pediatric psychopathology diagnosis. Further, as the anxious youth were drawn from a larger, ongoing study, we were able to include children and adolescents who specifically meet criteria for GAD and who did not yet have MDD. As the majority of depressed youth have prior diagnoses of anxiety (Avenevoli et al., 2001; Kessler et al., 2001) it is more difficult to ascertain youth who were depressed in the absence of anxiety. However, in the current sample nearly two-thirds of depressed youth (65.38%) did not have comorbid anxiety, thus allowing us some flexibility to disentangle the two disorders.

Importantly, the current study included a smaller age span as a means of reducing the potential for age to impact findings regarding shared and unique aspects of emotionality in anxiety and depression. Yet, despite our narrower age range, there remain developmental differences between 9- and 14-year-olds. For example, issues that upset a 14-year-old are likely to be different from those that would upset a 9-year-old. While we were not able to look at these differences within the context of the current study, this remains an important area for future research.

Another novel feature of this study is that in addition to measuring emotionality and emotion regulation through questionnaires, participants provided EMA data to further index affect, recent experiences involving negative emotions, and use of several emotion regulation strategies. EMA refers to the repeated collection of data on participants' mood in real time,

allowing us to obtain information on participants' thoughts and feelings in the moment. EMA has been shown to be an effective means of measuring real-time changes in mood and behavior in non-clinical (Adam, 2006; Larson et al., 1990; Larson, Moneta, Richards, & Wilson, 2002; Silk et al., 2003) and clinical samples of adolescents (Axelson et al., 2003; Silk et al., 2011; Tan et al., 2011). Utilizing EMA enables us to gain a richer perspective, by allowing us to home in on the experience of emotion and emotion regulation in response to situations that elicit negative emotions in youth's daily life. Further, evidence suggests that reports of behavioral and cognitive emotion regulation strategies are more accurately captured with EMA data as compared to data collected as soon as 48 hours later (Stone et al., 1998). Thus, EMA data provide an opportunity to further advance our understanding of unique and common factors of anxiety and depression.

1.16 HYPOTHESES

This study had three aims. Table 1 includes a summary of all hypotheses.

Aim 1: The first aim was to identify which aspects of emotionality and emotion regulation were unique to depression.

H1: We expected that DEP youth would exhibit lower levels of peak positive affect than the ANX and CON youth.

H2: We expected that DEP youth would report greater mean levels of peak sadness/upset than the ANX and CON youth.

H3: We expected that DEP youth would report a greater percentage of concerns relating to boredom, loneliness, and loss/grief than ANX and CON youth.

H4: We hypothesized that DEP youth would report greater rumination than ANX and CON youth.

Aim 2: The second aim was to identify which aspects of emotionality and emotion regulation were unique to anxiety.

H5: We hypothesized that ANX youth would exhibit higher levels of physiological hyperarousal than the DEP and CON youth.

H6: We expected that ANX youth would report greater mean levels of peak nervousness than the DEP and CON youth.

H7: We hypothesized that ANX youth would report a greater percentage of concerns relating to health, transient pain or discomfort, danger/fear, world events, and time than DEP and CON youth.

H8: We hypothesized that ANX group would report more worries and greater mean intensity of worries than DEP and CON youth.

H9: We expected that ANX youth would report more avoidance than DEP and CON youth.

Aim 3: The third aim was to examine which aspects of emotionality and emotion regulation were common to depression and anxiety.

H10: We expected that DEP and ANX youth would exhibit higher levels of global negative affect than CON youth.

H11: We expected that ANX and DEP youth would report greater mean levels of peak anger than CON youth.

H12: We hypothesized that DEP and ANX youth would report a greater percentage of concerns in the areas of school, peers, and family conflict than CON youth.

H13: We expected that ANX and DEP youth would have lower levels of effortful control than CON youth.

H14: We hypothesized that CON youth would report more problem-solving, cognitive restructuring, acceptance, and distraction than ANX and DEP youth.

Table 1

Hypotheses for Differentiating Anxiety and Depression

	Depression Only	Anxiety Only	Anxiety and Depression
Global Emotionality	Low Positive Affect	High Physiological Hyperarousal	High Negative Affect
Discrete Emotions	High Sadness	High Nervousness	High Anger
Context of Negative Emotions	Boredom Grief/Loss Loneliness	Health Concerns Transient Pain/Discomfort Danger/Fear World Events Time	School Peer Family Concerns
Effortful Control			Low Effortful Control
Emotion Regulation Strategies	High Rumination	High Worry High Avoidance	Low Problem Solving Low Acceptance Low Distraction Low Cognitive Restructuring

Note. The reference group for all hypotheses is a healthy control group.

2.0 METHOD

2.1 PARTICIPANTS

This project combined data collected from four studies: (1) the Child Anxiety Treatment Study (CATS), the Youth Emotional and Social Development Study (YES-D), the Family Based Interpersonal Psychotherapy (FB-IPT) for Depressed Preadolescents Study, and the Positive Affect Stimulation and Sustainment Study for Youth Depression (PASS). All studies were conducted at the University of Pittsburgh Medical Center (UPMC). The first two studies were part of the Families Emotion Neuroscience and Development Laboratory (PI: Jennifer Silk, PhD), while the third study was led by Laura Dietz, PhD, through the Services for Teens at Risk Clinic. Lastly, PASS was led by Dana McMakin, PhD.

The final sample included 165 participants between the ages of 9 and 14 ($M = 11.67$, $SD = 1.76$), with 27 youth with diagnoses of depression, 76 with GAD, and 62 healthy controls. In addition to diagnoses of GAD, 9 youth in the ANX group had comorbid diagnoses of Social Phobia, 7 had comorbid diagnoses of Separation Anxiety Disorder, and 1 youth had both Social Phobia and Separation Anxiety Disorder. The DEP group was composed of 23 youth with Major Depressive Disorder, 2 youth with dysthymia, and 2 youth with Depressive Disorder Not Otherwise Specified. Additionally, 37% of DEP youth had comorbid anxiety disorders; 5 had GAD, 2 had Social Phobia, 1 had Separation Anxiety Disorder, and 2 had both GAD and Social

Phobia. With respect to pharmacotherapy, one participant in the DEP group was taking a selective serotonin reuptake inhibitor (SSRI) and none of the participants in the ANX youth were taking SSRIs. Although this one DEP youth was on medication, this participant had been on medication for 2 months and still met criteria for Major Depressive Disorder, Severe.

2.2 RECRUITMENT

All studies recruited youth in part through UPMC's Western Psychiatric Institute and Clinic (WPIC) child and adolescent clinics, including the Services for Teens at Risk (STAR) Clinic, and through Pediatric PITTNET, a research network of pediatric practices administered through the University of Pittsburgh's Center for Translational Science Institute (CTSI). Additionally, CATS participants were identified through local school districts. Finally, CATS and YES-D recruited participants through radio and newspaper advertisements.

For all sources of recruitment, interested families completed a phone screen to determine their child's eligibility. Parents and youth in all studies then completed the Schedule for Affective Disorders and Schizophrenia in School-Age Children – Present and Lifetime version (KSADS-PL; Kaufman et al., 1997), which was utilized to determine final eligibility. Youth were classified as anxious if they met DSM-IV criteria for Generalized Anxiety Disorder. Anxious youth were also allowed to have comorbid Social Phobia and/or Separation Anxiety, as these anxiety diagnoses are highly comorbid with GAD (Kendall et al., 2010). Youth were classified as Depressed if they meet DSM-IV criteria for Major Depressive Disorder (MDD; YES-D, FB-IBT, and PASS), dysthymia or Depressive Disorder NOS (FB-IPT and PASS). Because of the high rates of prior anxiety disorders among depressed youth (Avenevoli et al.,

2001; Kessler et al., 2001), depressed youth were allowed to have a secondary anxiety diagnosis. Control participants had no history of DSM-IV diagnoses.

Exclusion criteria across all studies included evidence of mental retardation ($IQ < 70$), lifetime diagnoses of autism spectrum disorders, and current diagnosis of posttraumatic stress disorder (PTSD), oppositional defiant disorder, conduct disorder, and obsessive compulsive disorder (OCD), and ongoing psychoactive medication other than SSRI and stimulant medications. Individuals in the CATS, YES-D, and PASS samples were additionally excluded if they met criteria for bipolar disorder, psychotic depression, schizophrenia or schizoaffective disorder, substance abuse or dependence, or were acutely suicidal. Due to the study protocol, individuals in these studies were also excluded if they had motor impairment or hand-eye coordination problems, history of head injury, neurological disorders, poor vision (uncorrected $< 20/40$), and were unable to complete MRI procedures (e.g., cardiac pacemakers, metal braces). Anxious youth (CATS) were excluded if they met criteria for primary major depressive disorder, while depressed youth (YES-D and PASS) were excluded if they met for combined type or hyperactive type ADHD.

2.3 PROCEDURE

Children and parents completed all questionnaire measures upon their first day of study participation. Children and their parents also completed a semi-structured diagnostic interview to determine youth's psychiatry history. Children and their parents were interviewed separately using the KSADS-PL. Youth then completed an Ecological Momentary Assessment (EMA) protocol, which refers to the repeated collection of data on participants' mood in real time,

allowing us to obtain information on participants' thoughts and feelings in the moment. For this study, all participants completed 14 cell phone calls over an extended weekend (Thursday-Monday) where they answered questions about their current mood (Positive and Negative Affect Schedule, PANAS; Laurent et al., 1999) current activity, and their most positive and negative experiences over the past hour. During the phone calls, they also answered questions about how they coped with their negative experiences (e.g., what types of emotion regulation strategies they employed) and what they were worrying about. EMA has been demonstrated to be an effective means of gathering data in an adolescent population (Axelson et al., 2003; Silk et al., 2003). Since CATS, FB-IBT, and PASS participants were enrolled in treatment studies, the EMA data were collected prior to or at the beginning of treatment.

2.4 MEASURES

Table 2 contains a summary of the measures used to index components of emotion and emotion regulation. For measures that have both child- and parent-report available, analyses were conducted with each reporter independently. Appendix A includes the portions of the EMA script that are relevant to the current study.

Table 2

Summary of Primary Measures

Domain	Measure	Informant
Global Emotionality		
Negative Affect	Average ratings of peak sadness, upset, nervousness, and anger	Child – EMA
Positive Affect	Average rating of peak happiness	Child – EMA
Physiological Hyperarousal	Response to negative event in past hour	Child – EMA
Discrete Emotions		
Anger	Average rating of peak anger during negative event in past hour	Child – EMA
Sadness	Average rating of peak sadness during negative event in past hour	Child – EMA
Fear/Nervousness	Average rating of peak nervousness during negative event in past hour	Child – EMA
Context of Negative Emotion		
School	Category for negative event in past hour	Child – EMA
Peer		
Family Conflict		
Boredom		
Loneliness		
Loss/Grief		
Health		
Transient		
Pain/Discomfort		
Danger/Fear		
World Events		
Time		
Emotion Regulation and Emotion Regulation Strategies		
Effortful Control	Early Adolescent Temperament Questionnaire: Effortful Control Scale	Parent
Acceptance	Strategies endorsed in response to negative event in past hour	Child – EMA
Distraction		
Problem Solving		
Cognitive Restructuring		
Rumination		
Avoidance		
Worry	Total number of worries endorsed, mean intensity of worry	Child- EMA
Rumination	Children’s Response Styles Scale: Rumination Subscale	Child

2.4.1 Diagnostic group.

As outlined above, youth and their parents were interviewed by trained BA- and MA-level clinicians using the KSADS-PL. Clinical interviews were conducted separately for children and their parents and their responses were combined to determine final diagnoses. All diagnoses were derived using DSM-IV criteria and were reviewed by a child psychiatrist. The present study created a group for youth with anxiety (ANX), youth with depression (DEP) and a comparison group of healthy controls (CON).

2.4.2 Continuous measure of symptoms.

In addition to categorical measures of anxiety and depression, continuous measures of anxious and depressive symptoms were drawn from self- and parent-report data.

Depression symptoms. The Mood and Feelings Questionnaire (MFQ-P/C; Angold et al., 1995) measured the presence and severity of current depressive symptoms. Responses are on a 3 point scale (0 = not true; 1 = sometimes; 2 = true) to 33 items. Total scores on self- and parent-report were used to index depressive symptoms (MFQ-C: $\alpha = .948$; MFQ-P: $\alpha = .942$). Scores above 29 on the MFQ-C and above 27 on the MFQ-P are considered indicative of clinically significant levels of depression (Daviss et al., 2006).

Anxiety symptoms. The Self-Report for Childhood Anxiety Related Emotional Disorders (SCARED-P/C; Birmaher et al., 1997), measures the presence and severity of current anxious symptoms. Responses are on a 3 point scale (0 = not true or hardly ever true; 1 = somewhat true or sometimes true; 2 = very true or often true) to 41 items. Total scores on self- and parent-

reports were used to index anxious symptoms (SCARED-C: $\alpha = .942$; SCARED-P: $\alpha = .960$). Scores of 25 or higher are considered indicative of clinically significant levels of anxiety.

2.4.3 Global and discrete emotions.

During each EMA call, children rated their mood at the worst point during a self-nominated negative event occurring within the past hour. They completed four questions adapted from the Positive and Negative Affect Schedule (PANAS-C; Laurent et al., 1999), which ask participants to rate how angry, sad, nervous, and upset they are. Participants rated each emotion on a 5 point Likert-type scale (1 = very slightly or not at all; 5 = extremely). The degree each emotion was experienced was averaged across all phone calls to index peak emotional intensity. To measure global negative affect, levels of peak anger, sadness, nervousness, and upset were combined and averaged across calls.

As an index of positive affect, youth rated how happy they felt at the best point during a self-nominated positive event occurring within the past hour. Ratings were combined and averaged across all calls.

Finally, youth indicated whether they responded to the negative event by answering if they experienced a headache, stomachache, tight muscles, fast breathing, or became hot and sweaty, which served as a measure of physiological hyperarousal. The total number of times youth endorsed experiencing physiological hyperarousal in response to a negative event was calculated and divided by the total number of negative events to create a proportion score (i.e., to account for differences in total number of negative events across youth).

2.4.4 Context of negative emotions.

During the EMA calls, youth identified their most negative experience over the past hour. Specifically, they were prompted by being told: “Try to remember your feelings and thoughts over the past hour, Think about the time when you felt the worst, or most negative (e.g., mad, upset, nervous, disappointed, sad, worried).” Then they were asked “What happened?” If they did not have an answer, they received up to three follow-up prompts (see Appendix A). The research assistant making the phone call recorded the participant’s exact response. After the call, participant responses were grouped into 25 categories by type of event, based on common recurring responses for adolescents (see Appendix B for a complete list of categories). If a response fell into more than one category, the research assistant gathered more details to clarify which category most accurately captures the context of the negative emotion. A subset of calls were double-coded (YES-D: 988 calls, CATS: 911 calls) to calculate reliability estimates for categories of negative events. Inter-coder reliability was relatively high, with $k = .696$ (CATS) to $k = .703$ (YES-D). The present analysis focused on responses that fell into the following categories: school, peers, family conflict, boredom, loneliness, loss/grief, health, transient pain or discomfort, danger/fear, world events, and time. Proportion scores were computed by dividing the number of events reported in each category by the total number of negative events reported for each participant. As children were encouraged to answer this question for every call, even if they had difficulty thinking of a negative event, only responses in which their negative emotions were rated as 3 or higher were used (i.e., to ensure that the event was truly negative).

2.4.5 Emotion regulation.

The parent version of the Early Adolescent Temperament Questionnaire – Revised (EATQ-R; Ellis & Rothbart, 1999) was used to measure effortful control. The original Early Adolescent Temperament Questionnaire has been shown to be a reliable and valid measure of temperament (Capaldi & Rothbart, 1992). More recently, the EATQ-R has also been shown to be a reliable measure of temperament in 9- to 15-year-olds (Ellis & Rothbart, 2001). Scores from the Attention, Activation Control, and Inhibitory Control subscales were averaged to create a composite index of effortful control.

The Children's Response Styles Scale (CRSS; Ziegert and Kistner, 2002) assessed the frequency of youth engaging in ruminative coping and distraction when feeling sad. This self-report measure includes 20 statements rated on a 10 point scale (0 = never; 10 = always) to index how often participants usually engage in these behaviors. The 10 items measuring rumination were summed to create a total score for ruminative coping ($r = .873$).

During the EMA protocol, children and adolescents were asked what they were worrying about at the time the phone rang. They were able to provide up to three responses, where each response is rated on a 5 point scale to index the degree of worry (1 = very slightly or not at all; 5 = extremely). The total number of worries endorsed across phone calls was calculated as well as the mean intensity of their worries.

Additionally, during the EMA calls youth were asked a series of questions about their most negative experience in the past hour, including six questions directly assessing type of emotion regulation strategies employed (Silk et al., 2003). Each item maps onto a type of emotion regulation strategy: acceptance (e.g., Did you realize you just had to live with things the way they are?), distraction (e.g., Did you keep your mind off the problem by doing something

else?), problem solving (e.g., Did you do something to fix the problem or think of a way to make things better?), cognitive restructuring (e.g., Did you tell yourself it wasn't a big deal or try to think of it in a different way?), avoidance (e.g., Did you try to not think about it or try to forget all about it?), and rumination (e.g., Were you unable to stop thinking about how you were feeling?). For each call, participants received a binary score (0 = no; 1 = yes) indicating whether they utilized a particular strategy. The proportion of times that a subject endorsed using a particular emotion regulation strategy during completed EMA calls was calculated for all events in which peak negative affect was rated 3 or greater on any of the negative emotions (angry, sad, nervous, upset) to ensure that there was a high enough degree of emotion to regulate.

2.4.6 Covariates.

Demographic information was collected on participants' age, gender, race, and mother's highest level of education.

3.0 DATA ANALYTIC PLAN

First, youth were classified into three groups based on their KSADS diagnoses. The first group was comprised of participants who are considered to be ‘pure anxiety’ based on meeting criteria for a current diagnosis of GAD, the second group was comprised of participants who are considered to be depressed based on meeting criteria for a current diagnosis of MDD or Depression NOS, and the third group was comprised of youth without a history of psychological disorders (i.e., healthy controls). Analysis of Variance (ANOVA) was used to examine whether groups differ on age and level of maternal education and chi-square analysis (²) assessed whether groups differed on gender and race. Significant associations were included as covariates in all analyses (i.e., child age and race).

All hypotheses were tested using both categorical diagnoses and continuous symptom indices. Analyses of Covariance (ANCOVA) were used to test diagnostic group differences in emotionality and emotion regulation. All significant group differences were probed using post-hoc Least Significant Difference (LSD) tests of marginal means. Additionally, OLS regression was used to test hypotheses with continuous measures of symptoms, with analyses run separately with child- and parent-reports of symptoms. The decision to analyze our data with continuous symptom indexes in addition to categorical group allows us to examine whether findings were also upheld when taking into account concurrent anxious symptoms (and vice versa). Moreover, utilizing continuous symptom measures is consistent with a developmental psychopathology

approach, where individuals vary on a continuum (Rutter & Sroufe, 2000), in contrast to a binary diagnostic approach, which relies on an arbitrary cut-off point between ill and non-ill. Of note, there was no evidence of multicollinearity when simultaneously including anxious and depressive symptoms in any of the models.

Results are presented in order of hypotheses, with ANCOVA and regression findings presented together. All analyses controlled for child age and race. Additionally, given associations between gender and depression, and gender and some of our dependent variables (e.g., negative affect, rumination), gender was initially included as a covariate in all models. Analyses were re-run without gender, and results were comparable. As such, we present the results for models without gender.

Several youth had missing item-level data on questionnaires. We handled missing data by imputing the mean for the MFQ-C/P, and SCARED-C/P and imputing the subscale average for all subscales that had over 65% valid data for the CRSS and EATQ-R.

Of note, this study included 14 hypotheses, which were examined using both categorical and continuous symptom indices. Testing this many hypotheses inflates the chance of Type I error (i.e., the possibility of finding significant results by chance). Due to the small sample size of our depressed group, correcting for multiple comparisons would have limited our power to detect significant differences. With this in mind, we made the decision not to use corrections for multiple comparisons. However, our findings should be taken in light of this limitation.

4.0 RESULTS

4.1 DESCRIPTIVE STATISTICS

Descriptive statistics for each group are presented in Table 3. An analysis of variance (ANOVA) revealed significant group differences in age of participants, $F(2, 162) = 27.649, p < .001$. Post-hoc LSD tests indicated that ANX youth were significantly younger than MDD and CON youth. The pairwise comparison of the DEP youth with the CON youth was non-significant. A chi-square analysis showed significant group differences in participants' race,

$\chi^2(4, N = 165) = 23.345, p < .001$. Post-hoc tests indicated that youth in the ANX group were more likely to be Caucasian than youth in the CON or DEP groups. Analyses did not show significant group differences in gender, $\chi^2(2, N = 165) = 2.885, p = .236$, or maternal education, $F(2, 151) = .878, p = .418$. All subsequent analyses control for age and race. Correlations among variables are presented in Table 4. Of note, child-report of anxious and depressive symptoms were moderately correlated ($r = .578, p < .001$) as were parent-report of anxious and depressive symptoms ($r = .588, p < .001$). Child- and parent-report of symptoms were also moderately correlated with each other (anxiety: $r = .642, p < .001$, depression: $r = .476, p < .001$).

Table 3

Descriptive Statistics by Group

	Depressed Group Mean (SD)	Anxious Group Mean (SD)	Control Group Mean (SD)	F/χ^2
Age	12.79 (1.27)	10.73 (1.34)	12.34 (1.81)	27.649***
Gender (% Female)	74.07	56.59	56.45	2.885
Race				23.345***
% Caucasian	48.15	90.79	70.97	
% Black	37.04	3.95	17.74	
% Other	14.81	5.26	11.56	
Maternal Education ¹	5.64 (1.0)	5.86 (.98)	5.65 (1.04)	.878
Depressive Symptoms				
Child-report	31.85 (16.04)	18.40 (10.98)	8.56 (8.86)	38.481***
Parent-report	22.87 (13.79)	13.67 (9.45)	2.13 (2.76)	55.869***
Anxious Symptoms				
Child-report	31.33 (16.15)	39.63 (12.30)	14.82 (10.42)	62.531***
Parent-report	21.30 (12.24)	35.89 (12.90)	4.39 (4.48)	137.919***

¹ Maternal Education: 1 = Less than 7th grade, 2 = Jr. High School (9th grade), 3 = Some High School (10th or 11th grade), 4 = High School Graduate, 5 = Some College (at least 1 year), 6 = Standard College Degree, 7 = Graduate Professional Training

*** $p < .001$.

Table 4

Summary of Correlations between Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Female	-											
2. Age	.039	-										
3. DEP group	.132	.284**	-									
4. ANX group	-.053	-.497**	-.409**	-								
5. Depressive sx (C)	.069	-.029	.488**	.089	-							
6. Depressive sx (P)	.051	-.029	.466**	.225**	.476**	-						
7. Anxious sx (C)	.070	-.318**	.049	.584**	.578**	.420**	-					
8. Anxious sx (P)	.023	-.369**	-.022	.742**	.307**	.588**	.642**	-				
9. NA	.015	-.125	.102	.128	.338**	.171*	.358**	.166*	-			
10. PA	-.025	-.274**	-.052	.163*	-.029	-.036	.118	.018	.318**	-		
11. PH	.053	-.208**	.013	.214**	.187*	.293**	.276**	.268**	.194*	.098	-	
12. Sad	.052	-.190*	.171*	.113	.311**	.165*	.290*	.169*	.864**	.301**	.121	
13. Nervous	.020	-.067	-.150	.304**	.127	.118	.309**	.251**	.622**	.124	.302**	-
14. Irritable	.004	-.043	.136	-.014	.340**	.092	.288**	.036	.823**	.298**	.088	.394**
15. Effortful Control	.098	.006	-.356**	-.099	-.315**	-.472**	-.194*	-.268**	.082	.064	-.009	.566**
16. Acceptance	.229**	.103	.016	-.146	-.092	-.043	-.022	-.149	-.065	.053	-.024	.048
17. Distraction	.023	-.262**	-.002	.101	.013	.015	.110	.077	.056	.163*	.009	-.023
18. Cog. Restructure	.092	-.031	.085	-.015	.046	-.020	.119	.05	.067	.141	-.215**	.125
19. Prob. Solving	.038	-.167*	.006	.074	-.040	.022	.088	.088	.016	.192*	.122	.111
20. Rumination (Q)	.139	-.019	.232**	.087	.476**	.258**	.411**	.215*	.315**	.193*	.176*	-.032
21. Rumination	-.037	-.259**	-.017	.095	.067	.050	.218**	.149	.193*	.114	.351**	.281**
22. Avoidance	.024	-.141	.061	.031	.096	-.005	.137	.064	.029	.075	.024	.148
23. Total Worry	-.004	.046	-.243**	.184*	-.027	.036	.159*	.123	.292**	-.082	.143	.122

Note. C = child-report; P = parent-report; NA = Negative Affect; PA= Positive Affect; PH = Physiological Hyperarousal; Q = questionnaire.

* $p < .05$. ** $p < .01$.

Table 4 (continued)

	13	14	15	16	17	18	19	20	21	22	23
1. Female											
2. Age											
3. DEP group											
4. ANX group											
5. Depressive sx (C)											
6. Depressive sx (P)											
7. Anxious sx (C)											
8. Anxious sx (P)											
9. NA											
10. PA											
11. PH											
12. Sad											
13. Nervous	-										
14. Irritable	.339**	-									
15. Effortful Control	.082	.077	-								
16. Acceptance	-.096	.007	.057	-							
17. Distraction	-.025	.073	.052	.157	-						
18. Cog. Restructure	-.097	.109	.010	.381**	.292**	-					
19. Prob. Solving	.020	.048	.013	.024	.305**	.271**	-				
20. Rumination (Q)	.194*	.287**	-.152	.077	.037	.155	.051	-			
21. Rumination	.186*	.154	-.067	.106	.104	.082	.167*	.186*	-		
22. Avoidance	-.029	-.006	.085	.416**	.525**	.572**	.199*	.217*	.147	-	
23. Total Worry	.421**	.188*	.042	-.055	-.136	-.088	-.038	.107	-.006	-.074	-

Note. C = child-report; P = parent-report; NA = Negative Affect; PA= Positive Affect; PH = Physiological Hyperarousal; Q = questionnaire.

* $p < .05$. ** $p < .01$.

4.2 PRELIMINARY ANALYSES OF EMA DATA

Participants completed an average of 12.89 calls ($SD = 1.18$), with the average call lasting 6.91 minutes ($SD = 1.67$). A one-way ANOVA revealed significant group differences in the number of calls completed, $F(2, 162) = 3.503, p = .032$. Post-hoc LSD tests of marginal means indicated that ANX youth ($M = 13.20, SD = 0.94$) completed significantly more calls than CON youth ($M = 12.69, SD = 1.40$). There were no significant group differences in number of calls completed between DEP youth ($M = 12.78, SD = 1.16$) and ANX or CON youth. A one-way ANOVA revealed significant group differences in average call time, $F(2, 162) = 9.419, p < .001$. Post-hoc LSD tests indicated that average call time was significantly less for DEP youth ($M = 5.75, SD = 1.08$) than both ANX ($M = 7.29, SD = 1.90$) and CON youth ($M = 6.94, SD = 1.34$). There were no significant differences in average call time between ANX and CON youth. A one-way ANOVA showed there were no group differences in total number of negative events rated 3 or higher (DEP: $M = 6.70, SD = 4.204$; ANX: $M = 7.53, SD = 3.711$; CON: $M = 6.95, SD = 3.953$; $F(2, 150) = .572, p = .566$).

4.3 ASPECTS OF EMOTIONALITY AND EMOTION REGULATION

HYPOTHESIZED TO BE UNIQUE TO DEPRESSION

4.3.1 Global emotionality: Positive affect.

Table 5 includes group means and standard deviations for categories of global emotionality. An ANCOVA showed no significant group differences in levels of peak positive affect, $F(2, 159) = .243$, $p = .784$. Table 6 contains the results of regression analyses predicting associations between global emotionality and child- and parent-report of anxious and depressive symptoms. Regression analyses using child-report and parent-report symptoms also revealed no significant association between anxious and depressive symptoms and peak positive affect.

Table 5

Global and Discrete Emotionality by Group

	DEP Mean (SD)	ANX Mean (SD)	CON Mean (SD)	<i>F</i>
Peak Negative Affect	2.34 (0.69)	2.28 (0.65)	2.03 (0.53)	2.952 t
Peak Anger	2.77 (0.99)	2.49 (0.83)	2.41 (0.72)	1.500
Peak Sadness	2.40 _a (0.98)	2.19 _b (0.75)	1.85 _b (0.68)	5.954**
Peak Nervous	1.46 _a (.52)	1.93 _b (.77)	1.53 _a (.57)	6.673**
Peak Positive Affect	3.96 (0.74)	4.16 (0.66)	3.92 (0.67)	.243
Physiological Hyperarousal ¹	.14 (22)	.18 (.26)	.07 (.16)	2.377 t

Note. Means with differing subscripts within rows are significantly different at $p < .05$.

¹ Physiological hyperarousal scores are calculated as proportions to account for different number of negative events reported between participants.

t $p < .10$. ** $p < .01$.

Table 6

Regression Results for Global Emotionality

Variable	B	SE B	<i>B</i>	<i>t</i>
Child-Reported Symptoms				
Global Negative Emotionality				
Age	.004	.031	.011	.134
Black	-.080	.145	-.044	-.554
Other Race	-.219	.165	-.105	-1.328
Depressive Symptoms	.009	.004	.199	2.059*
Anxious Symptoms	.010	.004	.252	2.478*
Global Positive Emotionality				
Age	-.097	.034	-.248	-2.827**
Black	-.016	.162	-.008	-.098
Other Race	.182	.188	.079	.971
Depressive Symptoms	-.004	.005	-.082	-.813
Anxious Symptoms	.003	.004	.066	.616
Physiological Hyperarousal				
Age	-.023	.012	-.171	-1.885 t
Black	-.008	.059	-.012	-.137
Other Race	.050	.069	.061	.726
Depressive Symptoms	.002	.002	.127	1.239
Anxious Symptoms	.002	.002	.121	1.122
Parent-Reported Symptoms				
Global Negative Emotionality				
Age	-.027	.034	-.073	-.802
Black	.034	.161	.018	.209
Other Race	-.237	.182	-.110	-1.304

Table 6 (cont'd).

Depressive Symptoms	.006	.006	.110	1.015
Anxious Symptoms	.003	.004	.093	.800
Global Positive Emotionality				
Age	-.129	.034	-.329	-3.752 ***
Black	-.029	.163	-.014	-.176
Other Race	.100	.189	.043	.532
Depressive Symptoms	-.002	.006	-.031	-.301
Anxious Symptoms	-.003	.004	-.066	-.604
Physiological Hyperarousal				
Age	-.028	.012	-.206	-2.309*
Black	.009	.060	.012	.142
Other Race	.030	.066	.038	.457
Depressive Symptoms	.005	.002	.236	2.275*
Anxious Symptoms	.001	.001	.079	.707

t $p < .1$. * $p < .05$. ** $p < .01$. *** $p < .001$.

4.3.2 Discrete emotions: Sadness.

Table 5 includes means and standard deviations for discrete emotions for each of the three groups. An ANOVA revealed significant group differences in levels of sadness, $F(2, 154) = 5.954, p = .003$. Post-hoc LSD tests indicated that DEP youth reported significantly higher levels of peak sadness than ANX and CON youth, while the latter two groups did not differ in levels of peak sadness. Table 7 contains the results of regression analyses predicting associations between discrete emotions and both child- and parent-report anxious and depressive symptoms.

Regression analyses indicated that higher levels of self-reported depressive symptoms were significantly associated with higher levels of peak sadness ($B = 0.012, SE = 0.005, p = .024$). In contrast, anxious symptoms were not significantly associated with peak sadness. When using parent-report symptoms, neither anxious nor depressive symptoms were significantly associated with peak sadness.

Table 7

Regression Results for Discrete Emotions

Variable	B	SE B	<i>B</i>	<i>t</i>
Child-Report Symptoms				
Angry				
Age	.021	.041	.045	.521
Black	.144	.193	.060	.745
Other Race	-.104	.219	-.038	-.476
Depressive Symptoms	.014	.006	.234	2.375*
Anxious Symptoms	.009	.005	.186	1.796 t
Sad				
Age	-.036	.039	-.080	-.936
Black	-.090	.039	-.040	-.493
Other Race	-.360	.207	-.140	-1.739 t
Depressive Symptoms	.012	.005	.224	2.281*
Anxious Symptoms	.007	.005	.150	1.453
Nervous				
Age	.022	.034	.055	.637
Black	-.408	.161	-.207	-2.533*
Other Race	-.158	.183	-.0070	-.866
Depressive Symptoms	-.002	.005	-.042	-.417
Anxious Symptoms	.013	.004	.317	3.033**

Table 7 (cont'd).

Parent-Report Symptoms

Angry

Age	-.017	.045	-.034	-.372
Black	.255	.212	.104	1.200
Other Race	-.036	.241	-.013	-.149
Depressive Symptoms	.006	.008	.083	.750
Anxious Symptoms	.000	.006	-.002	-.016

Sad

Age	-.071	.042	-.153	-1.710 t
Black	.078	.199	.033	.391
Other Race	-.418	.225	-.154	-1.854 t
Depressive Symptoms	.012	.008	.169	1.587
Anxious Symptoms	.001	.005	.018	.162

Nervous

Age	.023	.036	.055	.626
Black	-.286	.172	-.138	-1.665 t
Other Race	-.161	.195	-.068	-.829
Depressive Symptoms	-.007	.007	-.110	-1.045
Anxious Symptoms	.014	.005	.340	3.021**

t $p < .10$. * $p < .05$. ** $p < .01$.

4.3.3 Context of negative emotions: Boredom, loneliness, and loss.

Table 8 contains the proportion of negative events endorsed for each category when considering negative events rated three or higher. The hypothesis regarding loneliness was unable to be explored due to the low frequency of events endorsed in this category. ANCOVAs indicated no significant group differences in proportion of negative events regarding boredom or loss, $F(2, 147) = .181, p = .835$, and $F(2, 147) = .155, p = .857$. Similarly, regression analyses indicated that levels of child- or parent-reported anxiety or depression were not significantly associated with proportion of negative events related to boredom or loss (Tables 9 and 10).

Table 8

Proportion of Negative Events by Group

Category	DEP Mean (SD)	ANX Mean (SD)	CON Mean (SD)	<i>F</i>
School	.04 (.10)	.06 (.15)	.04 (.09)	1.091
Peer	.04 (.08)	.04 (.13)	.07 (.17)	.913
Family	.28 (.29)	.22 (.25)	.15 (.21)	2.760 t
Boredom	.03 (.06)	.02 (.06)	.02 (.08)	.181
Lonely	0 (0)	0 (.02)	0 (0)	-
Loss	.01 (.02)	.01 (.05)	.01 (.07)	.155
Health	0 (0)	.01 (.07)	0 (.02)	-
Pain	.12 (.14)	.09 (.15)	.09 (.13)	.210
Fear	.02 (.07)	.05 (.11)	.02 (.06)	.780
Event	0 (0)	0 (0)	0 (.02)	-
Time	0 (0)	.01 (.04)	.01 (.04)	-

Note. Not all categories used, so proportions do not add up to 1. Means with differing subscripts within rows are significantly different at $p < .05$.

t $p < .10$.

Table 9 *Regression Results for Context of Negative Event– Child-Report Symptoms*

Variable	B	SE B	<i>B</i>	<i>t</i>
School				
Age	.005	.007	.067	.706
Black	-.004	.034	-.010	-.107
Other Races	.029	.039	.066	.751
Depressive Symptoms	-.001	.001	-.108	-1.009
Anxious Symptoms	.001	.001	.081	.720
Peers				
Age	-.003	.008	-.031	-.334
Black	.047	.038	.109	1.232
Other Races	-.047	.044	-.094	-1.075
Depressive Symptoms	.000	.001	-.004	-.041
Anxious Symptoms	.000	.001	-.040	-.355
Family				
Age	-.025	.013	-.170	-1.846 t
Black	.028	.065	.037	.433
Other Races	-.070	.075	-.079	-.922
Depressive Symptoms	.005	.002	.255	2.444 *
Anxious Symptoms	-.002	.002	-.152	-1.388
Boredom				
Age	-.003	.003	-.089	-.945
Black	-.004	.017	-.022	-.254
Other Races	-.021	.019	-.096	-1.097
Depressive Symptoms	.000	.000	.056	.528
Anxious Symptoms	.000	.000	.012	.107

Table 9 (cont'd).

Loss

Age	-.003	.003	-.083	-.893
Black	-.009	.015	-.054	-.614
Other Races	.032	.018	.159	1.892 t
Depressive Symptoms	.000	.000	.056	.533
Anxious Symptoms	.000	.000	-.108	-.968

Pain

Age	.005	.008	.063	.670
Black	.009	.037	.022	.249
Other Races	.012	.043	.025	.282
Depressive Symptoms	.000	.001	-.005	-.043
Anxious Symptoms	.001	.001	.112	.993

Fear

Age	-.006	.005	-.112	-1.315
Black	-.005	.024	-.019	-.220
Other Races	.045	.027	.142	1.639
Depressive Symptoms	-.001	.001	-.098	-.932
Anxious Symptoms	.001	.001	.117	1.065

t $p < .10$ * $p < .05$. ** $p < .01$.

Table 10 *Regression Results for Context of Negative Event– Parent-Report Symptoms*

Variable	B	SE B	<i>B</i>	<i>t</i>
School				
Age	.004	.007	.052	.547
Black	.006	.035	.015	.173
Other Races	.024	.038	.057	.645
Depressive Symptoms	-.002	.001	-.175	-1.581
Anxious Symptoms	.001	.001	.138	1.157
Peers				
Age	-.005	.007	-.069	-.727
Black	-.019	.033	-.052	-.584
Other Races	-.051	.036	-.123	-1.400
Depressive Symptoms	.000	.001	-.016	-.149
Anxious Symptoms	-.001	.001	-.084	-.701
Family				
Age	-.011	.014	-.077	-.804
Black	.034	.068	.044	.503
Other Races	-.038	.074	-.045	-.511
Depressive Symptoms	.001	.002	.066	.593
Anxious Symptoms	.001	.002	.047	.392
Boredom				
Age	-.004	.004	-.087	-.910
Black	.016	.020	.071	.802
Other Races	-.021	.021	-.087	-.994
Depressive Symptoms	.000	.001	-.023	-.208
Anxious Symptoms	.000	.000	-.056	-.469

Table 10 (cont'd).

Loss

Age	-.002	.003	-.051	-.540
Black	-.010	.016	-.057	-.643
Other Races	.029	.017	.148	1.689 t
Depressive Symptoms	.000	.001	-.003	-.027
Anxious Symptoms	.000	.000	-.012	-.099

Pain

Age	.004	.008	.050	.529
Black	.018	.038	.043	.484
Other Races	.000	.041	.001	.006
Depressive Symptoms	.002	.001	.202	1.830 t
Anxious Symptoms	-.001	.001	-.082	-.695

Fear

Age	-.006	.005	-.113	-1.207
Black	.001	.024	.003	.037
Other Races	.042	.026	.137	1.591
Depressive Symptoms	.000	.001	.023	.216
Anxious Symptoms	.001	.001	.129	1.101

t $p < .10$ * $p < .05$. ** $p < .01$.

4.3.4 Emotion regulation strategies: Rumination.

Table 11 includes the proportion of emotion regulation strategies used when considering negative events rated three or higher. ANCOVAs indicated no significant group difference in proportion of times youth endorsed using rumination during EMA calls, ($F(2, 147) = .017, p = .983$). In contrast, an ANCOVA revealed significant group differences in levels of rumination assessed via questionnaire, $F(2,139) = 7.433, p = .001$. Post-hoc LSD tests showed that DEP youth reported higher levels of rumination than ANX and CON youth, the former at trend level. ANX youth also reported significantly higher levels of rumination than CON at trend level.

Looking at continuous symptom measures, regression analyses indicated that there were no significant associations between child-reported depressed or anxious symptoms and proportion of time participants' endorsed rumination during negative events (Table 12). When considering rumination assessed via questionnaire, higher levels of child-reported depressive ($B = .535, SE = .142, p < .001$) and anxious ($B = .228, SE = .125, p = .071$) symptoms were significantly associated with higher levels of rumination, the latter at trend level. When assessing symptoms via parent-report, neither measure of rumination was not significantly associate with anxious or depressive symptoms (Table 13).

Table 11

Proportion of Emotion Regulation Strategies Used For Negative Events by Group

Emotion Regulation Strategy	DEP Mean (SD)	ANX Mean (SD)	CON Mean (SD)	<i>F</i>
Acceptance	.80 (.31)	.75 (.28)	.88 (.24)	1.307
Distraction	.47 (.37)	.50 (.28)	.43 (.31)	.645
Problem Solving	.44 (.31)	.46 (.29)	.40 (.33)	.097
Cognitive Restructuring	.73 (.35)	.66 (.31)	.65 (.33)	.338
Rumination (EMA)	.39 (.36)	.44 (.33)	.37 (.34)	.017
Avoidance	.78 (.28)	.75(.27)	.71 (.34)	.715
Worry				
Total Worry	1.63 _a (2.17)	5.05 _b (5.51)	4.11 _b (3.66)	6.150**
Mean Intensity of Worry	3.50 _a (1.01)	3.50 _a (.80)	2.76 _b (.68)	13.290 ***

Note. Can endorse multiple categories. Means with differing subscripts within rows are significantly different at $p < .05$.

Table 12 *Regression Results for Emotion Regulation Strategies – Child-Report Symptoms*

Variable	B	SE B	<i>B</i>	<i>t</i>
Acceptance				
Age	.026	.015	.161	1.713 t
Black	-.028	.074	-.033	-.375
Other Races	-.020	.086	-.020	-.231
Depressive Symptoms	-.003	.002	-.141	-1.326
Anxious Symptoms	.002	.002	.116	1.040
Distraction				
Age	-.053	.016	-.290	-3.231**
Black	-.128	.079	-.136	-1.610
Other Races	.047	.092	.043	.514
Depressive Symptoms	.001	.002	.038	.368
Anxious Symptoms	.000	.002	-.003	-.027
Problem-Solving				
Age	-.032	.017	-.175	.064 t
Black	.019	.083	.020	.817
Other Races	.089	.097	.080	.359
Depressive Symptoms	-.001	.002	-.036	.736
Anxious Symptoms	.000	.002	.015	.894
Cognitive Restructuring				
Age	-.006	.018	-.034	-.385
Black	.116	.085	.118	1.356
Other Races	.069	.099	.060	.691
Depressive Symptoms	-.001	.002	-.060	-.565
Anxious Symptoms	.004	.002	.180	1.621

Table 12 (cont'd).

EMA Rumination

Age	-.033	.015	-.186	-2.152*
Black	.117	.072	.133	1.640
Other Races	-.020	.081	-.020	-.250
Depressive Symptoms	.001	.002	.025	.250
Anxious Symptoms	.004	.002	.229	2.211*

CRSS Rumination

Age	.500	.992	.042	.504
Black	-5.446	4.576	-.093	-1.190
Other Races	-1.220	5.347	-.018	-.228
Depressive Symptoms	.535	.142	.372	3.771***
Anxious Symptoms	.228	.125	.187	1.821 t

Avoidance

Age	-.026	.016	-.146	-1.566
Black	-.017	.080	-.018	-.207
Other Races	.021	.093	.020	.225
Depressive Symptoms	.001	.002	.068	.648
Anxious Symptoms	.001	.002	.063	.565

t $p < .10$. * $p < .05$. *** $p < .001$.

Table 13 *Regression Results for Emotion Regulation Strategies – Parent-Report Symptoms*

Variable	B	SE B	<i>B</i>	<i>t</i>
Acceptance				
Age	.019	.014	.127	1.352
Black	.067	.071	.082	.936
Other Races	-.046	.077	-.052	-.596
Depressive Symptoms	.001	.003	.052	.475
Anxious Symptoms	-.002	.002	-.127	-1.080
Distraction				
Age	-.042	.016	-.243	-2.597*
Black	-.066	.080	-.072	-.825
Other Races	.029	.088	.029	.333
Depressive Symptoms	.002	.003	.063	.575
Anxious Symptoms	-.002	.002	-.094	-.801
Problem-Solving				
Age	-.033	.017	-.184	-1.947 t
Black	-.015	.084	-.016	-.178
Other Races	.076	.092	.072	.830
Depressive Symptoms	.001	.003	.041	.370
Anxious Symptoms	.000	.002	-.021	-.174
Cognitive Restructuring				
Age	-.001	.018	-.003	-.034
Black	.173	.089	.172	1.949 t
Other Races	.076	.097	.069	.788
Depressive Symptoms	-.001	.003	-.028	-.257
Anxious Symptoms	.001	.002	.081	.680

Table 13 (cont'd).

EMA Rumination

Age	-.065	.018	-.330	-3.659***
Black	.088	.088	.085	1.011
Other Races	.044	.095	.038	.458
Depressive Symptoms	.002	.002	.033	.624
Anxious Symptoms	.000	.003	-.022	-.016

CRSS Rumination

Age	.068	1.117	.006	.061
Black	-.772	5.194	-.013	-.149
Other Races	-2.271	6.036	-.033	-.376
Depressive Symptoms	.328	.205	.185	1.601
Anxious Symptoms	.134	.144	.113	.935

Avoidance

Age	-.014	.016	-.081	.852
Black	.139	.080	.153	1.734 t
Other Races	.007	.087	.007	.077
Depressive Symptoms	.000	.003	.003	.028
Anxious Symptoms	.001	.002	.035	.295

t $p < .10$. * $p < .05$. *** $p < .001$.

4.4 ASPECTS OF EMOTIONALITY AND EMOTION REGULATION

HYPOTHESIZED TO BE UNIQUE TO ANXIETY

4.4.1 Global emotionality: Physiological hyperarousal.

Table 5 includes means and standard deviations for physiological hyperarousal for each group. An ANCOVA revealed marginally significant group differences in physiological hyperarousal, $F(2, 147) = 2.377, p = .096$. Post-hoc LSD tests indicated that ANX youth endorsed a higher proportion of experiencing symptoms of physiological hyperarousal than CON youth, while there were no significant differences between ANX and DEP youth, or between DEP and CON youth. Regression analyses revealed no significant association between physiological hyperarousal and child-reported anxious or depressive symptoms (Table 6). In contrast, regression results indicated that higher levels of parent-reported depressive symptoms were significantly associated with a greater proportion of experiences of physiological hyperarousal ($B = 0.005, SE = 0.002, p = .025$). There was no significant association between parent-reported anxious symptoms and physiological hyperarousal (Table 6).

4.4.2 Discrete emotions: Nervousness.

An ANOVA indicated significant group differences in levels of nervousness, $F(2, 154) = 6.673, p = .002$. Post-hoc LSD tests revealed that ANX youth endorsed higher levels of peak nervousness than CON and DEP youth, whereas DEP and CON youth did not exhibit significant differences in peak nervousness (Table 5). Regression analyses revealed that higher levels of anxious symptoms were significantly associated with higher levels of peak nervousness (child-

report: $B = 0.013$, $SE = 0.004$, $p = .003$; parent-report: $B = 0.014$, $SE = 0.005$, $p = .003$). In contrast, there was no significant association between child- or parent-reported depressive symptoms and peak nervousness (Table 6).

4.4.3 Context of negative emotions: Health, pain, fear, world events, and time.

Hypotheses regarding the categories of health, world events, and time could not be explored due to the low frequency of reports of these types of negative events (Table 8). An ANCOVA indicated no significant group differences in the proportion of negative events regarding pain ($F(2, 147) = .210$, $p = .811$) or fear ($F(2, 147) = .780$, $p = .460$). Regression models indicated no significant associations between child- or parent-reported anxious symptoms and proportion of negative events regarding fear (Tables 9 and 10). Child-reported depressive symptoms were not significantly associated with proportion of negative events regarding fear, however higher levels of parent-reported depressive symptoms were significantly associated with greater proportion of negative events regarding pain at trend level, $B = 0.002$, $SE = 0.001$, $p = .069$.

4.4.4 Emotion regulation strategies: Worry.

Table 11 includes means and standard deviations for worry (total number and mean intensity) by group. An ANCOVA showed significant group differences in the amount of worry endorsed, $F(2, 159) = 6.150$, $p = .003$. Post-hoc LSD tests indicated that ANX youth endorsed more worries than both CON and DEP youth, the former at trend level. Additionally, CON youth endorsed more worries than DEP youth.

Table 14 includes the regression results for analyses predicting associations between worry (total number and mean intensity) and anxious and depressive symptoms. Regression analyses revealed that higher levels of child-reported depressive symptoms were associated with a significantly lower total number of worries ($B = -.073$, $SE = .034$, $p = .032$), while higher levels of child-reported anxious symptoms were associated with a significantly higher total number of worries ($B = .093$, $SE = .030$, $p = .002$). Additionally, higher levels of parent-reported anxious symptoms were associated with significantly higher total number of worries ($B = .065$, $SE = .030$, $p = .032$). Parent-reported depressive symptoms were not significantly associated with total number of worries.

Table 14

Regression Results for Worry

Variable	B	SE B	<i>B</i>	<i>t</i>
Child-Report Symptoms				
Total Number of Worries				
Age	.490	.233	.182	2.105*
Black	-2.158	1.103	-.159	-1.958 t
Other Races	-1.871	1.279	-.118	-1.463
Depressive Symptoms	-.073	.034	-.217	-2.167*
Anxious Symptoms	.093	.030	.333	3.149**
Mean Intensity of Worry				
Age	.001	.047	.001	.016
Black	-.196	.283	-.064	-.695
Other Races	.716	.298	.220	2.339*
Depressive Symptoms	.007	.007	.106	.955
Anxious Symptoms	.016	.006	.299	2.619*
Parent-Report Symptoms				
Total Number of Worries				
Age	.411	.239	.154	1.716 t
Black	-1.626	1.137	-.120	-1.430

Table 14 (cont'd).

Other Races	-1.406	1.314	-.089	-1.071
Depressive Symptoms	-.049	.043	-.119	-1.138
Anxious Symptoms	.065	.030	.243	2.165*
Mean Intensity of Worry				
Age	.056	.050	.110	1.117
Black	.114	.268	.038	.425
Other Races	.582	.279	.187	2.087*
Depressive Symptoms	.009	.009	.111	.939
Anxious Symptoms	.017	.006	.349	2.760**

t $p < .10$. * $p < .05$. ** $p < .01$.

There were also significant group differences in mean intensity of worry, $F(2, 113) = 13.290$, $p < .001$. Post-hoc LSD tests revealed that CON youth reported a lower mean intensity of worry than both ANX and DEP youth, while there were no significant differences in mean intensity of worry between the latter two groups (Table 11). Regression analyses revealed that higher levels of anxious symptoms were significantly associated with higher mean intensity of worry (child-reported: $B = .016$, $SE = .006$, $p = .010$; parent-reported: $B = .017$, $SE = .006$, $p = .007$). In contrast, neither child- nor parent-reported depressive symptoms were significantly associated with mean intensity of worry (Table 14).

4.4.5 Emotion regulation strategies: Avoidance.

ANCOVAs indicated that there were no significant group differences in proportion of times youth engaged in avoidance in response to negative events, $F(2, 147) = .715$, $p = .491$. Refer to Table 12 for means and standard deviations of avoidance for each group. Similarly, regression analyses showed no significant associations between child- or parent-reported anxious or depressive symptoms and proportion of times youth engaged in avoidance (Tables 12 and 13).

4.5 ASPECTS OF EMOTION AND EMOTION REGULATION HYPOTHESIZED TO BE COMMON

4.5.1 Global emotionality: Negative affect.

An analysis of covariance (ANCOVA) showed group differences in negative affect at trend level, $F(2, 154) = 2.952, p = .055$. Post-hoc LSD tests of marginal means indicated that levels of peak negative affect were significantly higher in DEP youth than in CON youth (Table 5). There were no significant differences in levels of peak negative affect between the ANX youth and DEP or CON youth.

When using child-report symptoms, regression analyses indicated that higher levels of depressive ($B = 0.009, SE = 0.004, p = .041$) and anxious ($B = 0.010, SE = 0.004, p = .014$) symptoms were associated with higher levels of peak negative affect (Table 6). In contrast, when using parent-report symptoms, there were no significant associations between anxious or depressive symptoms and peak negative affect (Table 6).

4.5.2 Discrete emotions: Anger.

Table 5 contains means and standard deviations of peak anger for each group. An ANCOVA revealed no significant group differences in levels of peak anger, $F(2, 154) = 1.500, p = .226$. Regression analyses (presented in Table 7) indicated that higher levels of self-reported depressive and anxious symptoms were significantly associated with greater peak anger, the latter at trend level (depressive symptoms: $B = 0.014, SE = 0.006, p = .019$; anxious symptoms: $B = 0.009, SE = 0.005, p = .075$). In contrast, when using parent-report symptoms to predict peak

anger, there were no significant associations between anxious or depressive symptoms and peak anger (Table 7).

4.5.3 Context of negative emotions: School, peers, and family.

Table 8 includes means and standard deviations for each group for school, peer, and family concerns. ANCOVAs indicated no significant group differences in proportion of negative events regarding school ($F(2, 147) = 1.091, p = .339$) or peers ($F(2, 147) = .913, p = .403$). There was a trend towards significant group differences in proportion of negative events regarding family, $F(2, 147) = 2.760, p = .067$. Post-hoc LSD tests showed that CON youth reported significantly fewer negative events regarding family than DEP youth. In contrast, there were no significant differences in proportion of negative events regarding family between ANX youth and either DEP or CON youth (Table 8).

Child-report depression and anxiety symptoms were not significantly associated with proportion of negative events related school or peers. Higher levels of child-report depressive symptoms were significantly associated with a greater proportion of family concerns reported ($B = .005, SE = .002, p = .016$), while there were no significant associations with child-reported anxiety symptoms (Table 9). Similarly, parent-report depression and anxiety symptoms were not significantly associated with proportion of negative events related to school, peers, or family (Table 10).

4.5.4 Emotion regulation: Effortful control.

An ANCOVA revealed significant group differences in levels of effortful control, $F(2, 153) = 18.89$, $p < .001$. Post-hoc LSD tests showed that CON youth ($M = 3.53$, $SD = .38$) had significantly higher levels of effortful control than both DEP ($M = 2.88$, $SD = .58$) and ANX ($M = 3.24$, $SD = .46$) youth. Additionally, ANX youth had higher levels of effortful control than DEP youth. Regression results revealed that higher levels of depressive symptoms were significantly associated with lower levels of effortful control (child-report: $B = -.011$, $SE = .004$, $p = .003$; parent-report: $B = -.02$, $SE = .004$, $p < .001$). There were no significant associations between child- or parent-reported anxious symptoms and levels of effortful control (Table 15).

Table 15

Regression Results for Effortful Control

Variable	B	SE B	<i>B</i>	<i>t</i>
Child-Report Symptoms				
Age	.003	.025	.009	.100
Black	-.172	.122	-.114	-1.412
Other Races	-.228	.135	-.136	-1.691 t
Depressive Symptoms	-.011	.004	-.302	-3.028**
Anxious Symptoms	-.001	.003	-.049	-.466
Parent-Report Symptoms				
Age	-.002	.023	.007	.087
Black	-.050	.110	-.035	-.459
Other Races	-.182	.127	-.108	-1.431
Depressive Symptoms	-.020	.004	-.457	-4.808***
Anxious Symptoms	.000	.003	-.001	-.013

t $p < .10$. ** $p < .01$. *** $p < .001$.

4.5.5 Emotion regulation strategies: Acceptance, distraction, problem-solving, and cognitive restructuring.

A series of ANCOVAs (Table 11) indicated that there were no significant group differences in proportion of times youth engaged in acceptance, $F(2, 147) = 1.307, p = .274$, distraction, $F(2, 147) = .645, p = .526$, problem-solving, $F(2, 147) = .097, p = .908$, or cognitive restructuring, $F(2, 147) = .338, p = .714$. Similarly, regression analyses revealed that there were no significant associations between child-reported or parent-reported depressive and anxious symptoms and proportion of times used acceptance, distraction, problem-solving, or cognitive restructuring (Tables 12 and 13).

4.6 DEVELOPMENTAL FINDINGS

Analyses revealed that age was significantly associated with aspects of emotionality. Regression analyses showed that being older was associated with lower levels of peak positive affect (child-report symptoms: $\beta = -.248, p = .005$; parent-report symptoms: $\beta = -.329, p < .001$) and lower levels of physiological hyperarousal (child-report symptoms: $\beta = -.171, p = .062$; parent-report symptoms: $\beta = -.206, p = .023$). When looking at parent-reported symptoms, regression results indicated being older was associated with lower levels of peak sadness than younger youth at trend level ($\beta = -.153, p = .090$). Age was also significantly associated with the context of negative events. Regression analyses with child-report of symptoms, being older was associated with reported less negative events related to family concerns at trend level ($\beta = -.170, p = .067$).

With respect to emotion regulation, age was significantly associated with strategy use. Being older was associated with higher rates of acceptance at trend level (child-report symptoms: $\beta = .161, p = .089$) and total worry (child-report symptoms: $\beta = .182, p = .037$; parent-report symptoms: $\beta = .054, p = .088$). In contrast, being older was associated with lower rates of distraction (child-report symptoms: $\beta = -.290, p = .002$; parent-report symptoms: $\beta = -.243, p = .010$) and rumination assessed via EMA (child-report symptoms: $\beta = -.227, p = .013$; parent-report symptoms: $\beta = -.330, p < .001$). Lastly, being older was associated with lower rates of problem-solving at trend level (child-report symptoms: $\beta = -.175, p = .064$, parent-report symptoms: $\beta = -.184, p = .054$).

5.0 DISCUSSION

The current study utilized EMA to examine whether youth with clinically significant anxiety and depression could be differentiated based on aspects of emotionality and emotion regulation.

Given the extensive number of hypotheses tested, we present a summary of which hypotheses were supported when using categorical diagnostic groups (Table 16) and continuous report of symptoms, based on child- (Table 17) and parent- report (Table 18). Overall, there was mixed support for our hypotheses, with findings varying based on the use of categorical diagnoses versus dimensional symptom measures. We first review our findings on unique and shared characteristics of emotionality and emotion regulation, as well as hypotheses that were not supported. We then turn to a discussion of relevant developmental considerations, suggestions for future research, and clinical implications.

Table 16

Summary of Results When Using Categorical Symptom Measures

	Depression Only	Anxiety Only	Depression and Anxiety	Hypothesis Supported
Global Emotionality				
Peak Negative Emotionality				
Peak Positive Emotionality				
Physiological Hyperarousal				
Discrete Emotions				
Peak Anger				
Peak Sadness	X			X
Peak Nervousness		X		X
Context of Negative Emotions				
School				
Peer				
Family				
Boredom				
Loss				
Pain				
Fear				
Effortful Control			X	X
Emotion Regulation Strategies				
Acceptance				
Distraction				
Problem-Solving				
Cognitive Restructuring				
Rumination (EMA)				
Rumination (questionnaire)	X			X
Avoidance				
Total Worry		X		X
Mean Intensity of Worry			X	

Note. The reference group for all hypotheses is a healthy control group. An X denotes what our results support.

Table 17

Summary of Results When Using Continuous Symptom Measures – Child-Report

	Depression Only	Anxiety Only	Depression and Anxiety	Hypothesis Supported
Global Emotionality				
Peak Negative Emotionality			X	X
Peak Positive Emotionality				
Physiological Hyperarousal				
Discrete Emotions				
Peak Anger	X			
Peak Sadness	X			X
Peak Nervousness		X		X
Context of Negative Emotions				
School				
Peer				
Family	X			
Boredom				
Loss				
Pain				
Fear				
Effortful Control	X			
Emotion Regulation Strategies				
Acceptance				
Distraction				
Problem-Solving				
Cognitive Restructuring				
Rumination (EMA)				
Rumination (questionnaire)	X			X
Avoidance				
Total Worry		X		X
Mean Intensity of Worry		X		X

Note. An X denotes what our results support.

Table 18

Summary of Results When Using Continuous Symptom Measures – Parent-Report

	Depression Only	Anxiety Only	Depression and Anxiety	Hypothesis Supported
Global Emotionality				
Peak Negative Emotionality				
Peak Positive Emotionality				
Physiological Hyperarousal ^a	X			
Discrete Emotions				
Peak Anger				
Peak Sadness				
Peak Nervousness		X		X
Context of Negative Emotions				
School				
Peer				
Family				
Boredom				
Loss				
Pain				
Fear				
Effortful Control	X			
Emotion Regulation Strategies				
Acceptance				
Distraction				
Problem-Solving				
Cognitive Restructuring				
Rumination (EMA)				
Rumination (questionnaire)				
Avoidance				
Total Worry		X		X
Mean Intensity of Worry		X		X

Note. An X denotes what our results support.

5.1 EXPERIENCES OF EMOTIONALITY AND EMOTION REGULATION UNIQUE TO DEPRESSION

Consistent with our hypothesis, we found that sadness was specific to depression. Higher levels of average peak sadness endorsed during recent negative events were associated with belonging to the depressed group and with higher levels of child-reported depressive symptoms, while average peak sadness was not significantly associated with belonging to the anxious group or with levels of anxiety symptoms. Thus, the association between sadness and depression was supported when examining both continuous and categorical measures of symptoms. Given that depressed mood is one of the core symptoms of depression (APA, 2013), it is not surprising that our results support sadness being specific to depression. Few studies have examined the specificity in how different discrete negative emotions map onto depression and anxiety. In a sample of adults, individuals with diagnoses of GAD and MDD were compared on lower-order emotions, with findings suggesting that sadness was specific to depression (Watson, Clark, & Stasic, 2011). Additionally, sad mood has been shown to predict subsequent MDD in 14 to 18 year-olds, even after including all other symptoms of depression in the model (Georgiades et al., 2006).

Interestingly, higher levels of child-reported depressive symptoms were significantly associated with higher levels of family concerns, while anxious symptoms were not. Our finding is consistent with research demonstrating links between adolescent depression and family conflict (Consoli et al., 2013; Ogburn et al., 2010; Rice, Harold, Shelton, & Thapar, 2006; Sheeber, Hops, Alpert, Davis, & Andrews, 1997; Telzer & Fuligni, 2013). Being depressed may alter an individual's perceptions to be more negative (i.e., perceive more conflict) and, conversely, being involved in more (perceived) conflict may increase depressive symptoms, such

as negative mood. Indeed, research supports the bidirectional nature of these associations during early adolescence (Brière, Archambault, & Janosz, 2013), with improvements in parent-child conflict associated with depression remission and vice versa (Rengasamy et al., 2013). In contrast, a recent review of the role of family factors in anxiety indicated limited associations between anxiety and family conflict (Rapee, 2012). Relatedly, Queen and colleagues found family conflict to predict depressive, but not anxious, symptoms in a clinical sample of 11 to 18 year-olds (Queen, Stewart, Ehrenreich-May, & Pincus, 2013). Parents of anxious youth often respond with accommodation (Lebowitz, Sharfstein, & Jones, 2014) and overprotection (Rapee, 2012; McLeod, Wood, & Weisz, 2007), which serves to minimize discomfort in anxiety-inducing situations. In responding this way, it may be the case that anxious youth see their parents as aligned with them, and thus, not a source of negativity.

When examining continuous symptom measures, rumination was significantly associated with depressive symptoms based on child-report of symptoms. This finding was corroborated with categorical analyses: depressed youth had significantly higher levels of rumination than anxious or control youth. This finding is in support of our hypothesis. Rumination may be associated with depression in that this pattern of thinking can amplify and prolong negative affect (Nolen-Hoeksema et al., 2008; Raes & Hermans, 2008; Thomsen, 2006) and interfere with problem-solving (Erdur-Baker, 2009; Nolen-Hoeksema et al., 2008).

5.2 EXPERIENCES OF EMOTIONALITY AND EMOTION REGULATION UNIQUE TO ANXIETY

As expected, high peak nervousness was also found to uniquely characterize anxious youth, whether examined continuously or categorically, with both child- and parent-report of symptoms. This finding replicates other research demonstrating higher average levels of peak nervousness in youth with primary diagnoses of GAD, social anxiety, and separation anxiety compared to non-anxious youth (Tan et al., 2011). While the current sample was comprised of a subset of these youth (i.e., those with primary diagnoses of GAD), Tan et al. (2011) utilized a different group of control participants. Additionally, in adults with GAD and history of MDD, daily anxious mood predicted depressed mood up to four days later, whereas daily depressed mood was generally not predictive of future anxious mood (Starr & Davila, 2012), further supporting the notion that anxiety can be distinguished from depression based on discrete emotional states.

We hypothesized that two dimensions of worrying, the total number of worries reported and the mean intensity of worry, would be significantly higher in anxious youth. Higher levels of child-reported anxious symptoms were significantly associated with a greater frequency of worry; this finding was corroborated with analyses using parent-report of symptoms. Additionally, youth in the anxious group endorsed a greater frequency of worry than youth in the depressed group. As excessive worry is a core feature of anxiety (APA, 2013), it is not surprising that anxious youth reported higher levels of worry. Interestingly, when examining diagnostic group differences, anxious youth did not endorse significantly more worries than healthy youth. Given that this was not the case when examining child- or parent-report of symptoms, we are cautious about drawing any conclusions about this finding.

Additionally, greater mean intensity of worry was significantly associated with both child- and parent-report of anxious, but not depressed, symptoms. This finding is consistent with research showing that youth with anxiety disorders display greater intensity of worry than healthy youth (Suveg & Zeman, 2004). However, when examined categorically, both anxious and depressed youth had significantly higher mean intensity of worry than control youth. Interestingly while anxious youth reported a greater number of worries than depressed youth, these groups did not differ with respect to mean intensity of worry. This finding suggests that it is the amount of worrying, rather than its intensity, that differentiates youth who have clinical diagnoses of anxiety from diagnoses of depression. Consistent with this, healthy youth who endorsed more worries per day displayed greater anxious affect, while amount of worrying was not significantly associated with sad affect (Dickson et al., 2012). Moreover, in a clinical sample of adults, higher levels of worry distinguished individuals with diagnoses of GAD only from those with diagnoses of MDD only (Chelminski & Zimmerman, 2003). Of note, this finding was not corroborated with analyses of continuous symptoms, as anxious, but not depressive, symptoms were significantly associated with higher mean intensity of worry. However, as depressive and anxious symptoms were included in the same model, this may suggest that the association between mean intensity of worry and depression is fully accounted for by overlapping features of depression and anxiety. Consistent with this, when the model was re-run without anxious symptoms, child-reported depressive symptoms were significantly associated with mean intensity of worry (data available upon request).

5.3 EXPERIENCES OF EMOTIONALITY AND EMOTION REGULATION COMMON TO DEPRESSION AND ANXIETY

In addition to testing for aspects of emotionality and emotion regulation that were unique to either depression or anxiety, we set out to confirm whether certain characteristics of emotionality and emotion regulation were common among clinically anxious and depressed youth. Consistent with our hypothesis, higher levels of child-reported anxious and depressive symptoms were associated with higher levels of negative affect, suggesting that one means of accounting for the high overlap between anxiety and depression is due to both disorders being characterized by high levels of general distress (Clark & Watson, 1991). This finding was not corroborated when examining parent-report of symptoms. Further, when looking at group differences, neither anxious nor depressed youth had significantly higher levels of negative affect than control youth. Given the amassed research supporting high negative affect to be a common feature of anxiety and depression (for review, see Anderson & Hope, 2008), our lack of support when comparing diagnostic groups is an anomaly. Our measure of negative affect was calculated by averaging peak levels of anger, nervousness, and sadness; given our findings that nervousness was specific to anxiety and sadness was specific to depression, it is possible that including both emotions in our composite measure masked associations with either diagnosis. For example, with nervousness and sadness are both of negative valence, they differ on levels of arousal, with nervousness having a higher arousal than sadness (e.g., Posner et al. 2005; Russell, 1980). By averaging peak nervousness and peak sadness, we may have minimized the relationship between negative emotionality and either diagnostic group.

We also found support for the discrete emotion of anger to be associated with higher levels of child-reported depressive symptoms. As this finding was not upheld when using parent-

report of symptoms, this finding should be interpreted with caution. Additionally levels of peak anger did not significantly differentiate the anxious or depressed groups from the control group, suggesting that anger does not differentiate youth who have clinical diagnoses of anxiety or depression from healthy youth. This is in contrast to our hypothesis and to data from a representative sample of the United States indicating that approximately half of individuals ages 18 or older who meet diagnostic criteria for MDD display heightened irritability, and that these individuals are more likely to have concurrent comorbid anxiety diagnoses than individuals with MDD not characterized by irritability (Fava et al., 2010). Relatedly, in a clinical sample of children and adolescents, anxious youth who endorsed irritability were 15 to 16 times more likely to meet DSM-IV diagnostic criteria for GAD than anxious youth who did not endorse irritability (Pina et al., 2002). In another sample of clinically anxious youth, amongst the six associated features of GAD, irritability had the strongest association with diagnoses of GAD compared to other anxiety disorders, even after accounting for comorbid depressive symptoms (Comer, Pincus, & Hofmann, 2012). Our non-significant finding when comparing diagnostic groups, may be attributed to the age of our participants. Consistent with this possibility, in another study in our lab that included older youth with MDD (mean age = 12.60; range: 7-17), individuals in the MDD group reported significantly higher average peak anger than individuals in the control group (Silk et al., 2011).

Consistent with prior literature (De Boo & Spiering, 2010; Vervoort et al., 2011; Yap et al., 2011; Zalewski, Lengua, Wilson, Trancik, & Bazinet, 2011), anxious and depressed youth were characterized by lower levels of effortful control than control youth. One explanation for the inverse relationship between effortful control and anxiety and depression is that higher levels of effortful control may help an individual to modulate the experience of negative emotions. In

contrast, children with lower effortful control may be lacking the means to self-regulate, and therefore, cannot shift attention away from their distress (Lonigan, Vasey, Phillips, & Hazen, 2004). Indeed, among children with high negative affect, those with high effortful control display lower levels of depressive symptoms (Kotelnikova, Mackrell, Jordan, & Hayden, 2014; Muris, 2006; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007; Yap et al., 2011). When looking at continuous measures of symptoms, lower levels of effortful control were associated with higher levels of child- and parent-reported depressive symptoms, while they were not linked with either child- or parent-reported anxious symptoms. One explanation for this pattern of results is that the relationship between anxiety and effortful control may be through the overlapping aspects of anxiety and depression (e.g., shared variance). Indeed, when the model was re-run without depressive symptoms, child-reported anxiety symptoms were significantly associated with effortful control (data available upon request). Alternatively, this pattern of results may suggest that although effortful control is related to both anxiety and depression, it is more strongly associated with depression, since the association between anxiety and effortful control is not upheld once taking into account concurrent depressive symptoms.

5.4 HYPOTHESES THAT WERE NOT SUPPORTED

We found no significant associations between anxiety and physiological hyperarousal, when considering symptoms or diagnostic groups. It may be that the relationship between physiological hyperarousal and either disorder has more to do with the clinical presentation, in which some youth may display more somatic complaints than others. Lending support to this, several studies, utilizing both child and adult samples, have shown physiological hyperarousal to

be associated with panic disorder and not GAD (Chorpita et al., 1998; den Hollander-Gijsman, de Beurs, van der Wee, van Rood, & Zitman, 2010); panic disorder notably has more somatic symptoms than GAD. Interestingly, when using parent-report of symptoms, our findings revealed a specific association between high physiological hyperarousal and depression symptoms. Although unexpected, there are studies that find associations between high physiological hyperarousal and depression (De Bolle, De Clercq, Decuyper, & De Fruyt, 2011; Greaves-Lord et al., 2007). However, this finding should be interpreted cautiously, as it was not corroborated with child-report of symptoms in the current sample.

We did not find associations between average peak positive affect and either depression or anxiety. Although we hypothesized that low levels of positive affect would be specific to depression, more recent studies support an association between positive affect and anxiety (Lee et al., 2014; Waters, Pittaway, Mogg, Bradley, & Pine, 2013). Our lack of significant associations between positive affect and depression and anxiety may be due to age differences in our sample and other studies. In addition to a significant negative correlation between age and peak positive affect ($r = -.274, p < .001$), age was a significant predictor in our regression model assessing symptom differences in positive affect. The current study was largely comprised of youth from two existing studies, one comparing 9 to 17 year-old youth with MDD to controls, and another comparing 9 to 14 year-old youth with primary diagnoses of GAD, Separation Anxiety, and Social Phobia to controls. In order to limit age differences in the current study, we limited our sample to youth ages 9 to 14 year-olds; we also only included anxious youth with a primary diagnosis of GAD. When considering the entire sample of MDD youth (i.e., through age 17), Silk et al. (2011) found group differences in the ratio of positive to negative affect in youth with MDD compared to controls; however, this association was moderated by puberty, such that

there were no significant group differences between the ratio of positive to negative affect in pre-pubertal youth.

With the exception of family concerns, we did not find support for the context of negative events distinguishing between anxiety and depression. In general, the context areas we selected only comprised a small proportion of negative events reported; family concerns accounted for 11.4%, transient pain accounted for 10.1%, and school, peer, loss, boredom, and fear accounted for 11.8% combined. Categories that youth endorsed more frequently included disappointment, inconvenience/minor irritation and having to do something they did not want to do (i.e., engaging in a non-preferred activity).

In terms of emotion regulation strategy use, we did not find significant associations between either depression or anxiety and use of acceptance, distraction, problem-solving, avoidance or cognitive restructuring, when looking at diagnostic groups or symptoms of disorders. However, among the full sample, significant differences in emotion regulation strategy use measured via EMA emerged between the MDD youth and controls (Silk, Whalen, Forbes, Ryan, & Dahl, 2012), specifically increases in rumination and physiological hyperarousal, indicating that our inability to detect group differences may be a function of the younger age of our participants. Furthermore, Dietz et al. (2014) demonstrate that increased use of problem-solving is linked with higher rates of MDD remission among 13 to 18 year-olds, providing additional indication that our lack of findings related to strategy use may be an artifact of age. Extending these findings to the current study, perhaps significant differences would have emerged if we had been able to measure success at implementing these strategies. This explanation is supported by recent research suggesting that while anxious youth demonstrate

understanding of adaptive coping skills, they exhibit difficulty employing an appropriate strategy when facing distress (Tan et al., 2011).

5.5 DEVELOPMENTAL CONSIDERATIONS

Some aspects of emotionality and emotion regulation varied based on the age of the participant. As previously discussed, being older was related to lower positive affect and lower physiological hyperarousal, consistent with prior research (e.g., Chorpita, 2002). Being older was also associated with higher levels of worry and less use of distraction, consistent with prior research (Hampel & Petermann, 2005; Vasey, Crnic, and Carter, 1994). Increased worrying with age may be due to age-related increases in the ability to identify negative outcomes associated with their worries should they become realized (Vasey et al., 1994), as well as increases in abstract reasoning and meta-cognitive thinking. Surprisingly, older participants endorsed less rumination than younger participants. This is in contrast to research suggesting that rumination increases with age (Hampel & Petermann, 2005). However, the magnitude of these effects are quite small (*B*s ranging from -.186 to -.330).

Relatedly, our findings varied based on whether parent or child was reporting on symptom levels. In general, there was consistency across parent and child report for associations with anxious, but not depressive, symptoms, even when controlling for age differences. While youth are generally considered better reporters on internalizing symptoms than parents (Angold et al., 1987), anxiety may be more observable than depression, particularly when considering observable symptoms, such as restlessness and irritability. Parents may also be better reporters of their child's anxiety due to the age difference between groups in the current study. Youth in the

anxious group were younger than youth in the depressed group, and younger children may be more reliant on their parents for emotion regulation than older youth (Eisenberg, & Morris, 2002).

5.6 LIMITATIONS

This study should be taken in light of several limitations. As with most extant research, there were limitations in our ability to find enough individuals who have ‘pure’ cases of anxiety or depression. While we were fortunate to have been able to recruit a subset of youth who have anxiety in the absence of depression, this was more difficult with regard to depressed youth. Taking into account the difficulty in recruiting depressed youth and related concerns regarding statistical power, we chose to include depressed youth who had a secondary diagnosis of anxiety. Nearly two-fifths (37%) of our depression sample had comorbid anxiety. Although we were not able to re-run analyses without these youth due to the small sample size of the depressed group, we also tested our hypotheses with continuous symptom measures, which allowed us to examine whether significant associations with depression were upheld when taking into account concurrent anxious symptoms.

Relatedly, in our efforts to minimize the age differences across anxious and depressed participants, who were drawn from ongoing studies, our depressed youth were relatively young (i.e., under 15). Some data suggest that depression that onsets in childhood may be qualitatively distinct from depression that onsets in adolescence. For example, in Silberg, Rutter, and Eaves’ (2001) study of 8 to 16 year-old female twin pairs, depression that onset prior to age 14 was associated with shared environment features, while depression that began at age 14 or later was

more heritable and less associated with environmental factors. Furthermore, it appears that anxiety may be more similar to adolescent depression than childhood depression. For example, Silberg et al. (2001) found that youth with overanxious disorder (i.e., GAD) have the same genetic risk as youth who develop depression after age 14 (but not younger depressed youth). Therefore, it is possible that our findings would have been different had we included older depressed youth.

An additional limitation to consider is that we captured children's diagnoses in late childhood to early adolescence. It is possible that some of the anxious youth might later develop depression (and, less likely, that some of the depressed youth will later manifest with anxiety). Our conclusions should be interpreted in light of this possibility. On a related note, some of the youth in the current sample reported having engaged in prior treatment. Youth who engaged in treatment may have already learned to use more adaptive coping strategies, such as increased distraction and reduced rumination, which may account for the higher than expected rates of some of these adaptive emotion regulation strategies in depressed and anxious youth. However, we do not have sufficient data on reasons for treatment or type of treatment, prohibiting us from examining whether our findings would still hold once taking into account the effects of treatment.

Finally, this study tested a large number of hypotheses, which increases the likelihood of having found significant results by chance. We could have reduced our potential for Type I error by testing sets of variables (e.g., all three aspects of global emotionality) prior to examining these variables separately; however, this would have limited our power, in particular due to the small sample size of our depressed group. Therefore, we made the decision not to correct for multiple comparisons due to the small sample size of our depressed group and due to the exploratory,

descriptive nature of many of our hypotheses. Arguably, results that were supported with both continuous and categorical measures of depression and anxiety may be considered more robust.

5.7 OVERALL CONCLUSIONS REGARDING UNIQUE VERSUS SHARED ASPECTS OF EMOTIONALITY AND EMOTION REGULATION

Considering findings that were corroborated across reporters or across analyses (e.g., continuous and categorical indices of depression and anxiety), we had the most support for sadness and rumination being specific to depression and nervousness and frequency of worry being specific to anxiety. In contrast, our findings regarding shared factors were more tenuous. For example, when considering diagnoses, intensity of worry was associated with both anxiety and depression, whereas when considering symptoms, it was only related to anxiety. However, including both anxious and depressive symptoms in the same models was a conservative approach. Indeed, when considering anxious symptoms without controlling for depressive symptoms or vice versa, more evidence for shared features emerged (e.g., rumination, effortful control, intensity of worry). Taken together, this suggests that the core features of each disorder are unique (e.g., anxious and depressed mood), whereas there is more overlap between aspects of emotion regulation. Our findings are consistent with, Price et al. (2013), who examined DSM-IV oriented scales on the Child Behavior Checklist in a non-clinical sample of 7-18 year olds. The authors' found that a six-factor model fit best, in which anxiety and affective disorders loaded on separate factors; however, when considering only younger children (ages 7 to 10), anxiety and affective disorders loaded onto the same factor (negative affect).

5.8 FUTURE DIRECTIONS

Findings from the current study only support correlates of existing symptom presentations due to the cross-sectional nature of this study. This begs the question of whether these features may also be unique risk factors for onset of anxiety or depression. To address this, future research needs to include longitudinal studies, in particular of youth at high risk for both diagnoses, such as those with high genetic vulnerability, which has been shown to be a non-specific risk factor.

An additional line of needed future research is to develop a further understanding of shared characteristics of emotionality and emotion regulation. Recently, Cummings, Caporino, and Kendall (2013) reviewed evidence for three potential models of the comorbidity of anxiety and depression in youth. They found that associations between GAD and depression were best accounted for by the model that considered concurrent comorbidity, as opposed to successive comorbidity, suggesting that MDD and GAD have a shared diathesis. These authors comment on the need for research to identify specific factors that distinguish between these diagnoses, in order to clarify whether the overlap in these diagnoses is not a result of symptom overlap. Thus, it is important to continue to examine whether the areas we identified are indeed specific to depression (i.e., peak sadness, family concerns) or anxiety (e.g., peak nervousness, amount of worry), both in youth who at-risk for these disorders and for youth who already present with MDD and GAD.

Given our age-related findings, it is worth considering whether questions about emotion regulation strategies hold different meaning to youth based on their age. A handful of studies show that rumination is present in middle to late childhood (e.g., Gentzler, Wheat, & Palmer, 2013; Hampel & Petermann, 2005), with rumination being assessed as early as age 7 (Gentzler et al., 2013). Yet, it is possible that these concepts mean different things to younger and older youth

(e.g., Skinner & Zimmer-Gembeck, 2009), as there are age-related changes in how a given strategy is expressed (for review, see Zimmer-Gembeck & Skinner, 2011). Therefore, it is worth exploring how youth differentially conceptualize coping strategies as a function of age. One means to achieve this would be for future studies to also incorporate open-ended questions about emotion regulation.

Lastly, although not the focus of the current study, it is important to consider the child in context (Sameroff & Chandler, 1975). Parents play an important role in youth's development of emotion communication (Hare, 2011; Raikes & Thompson, 2008), which impacts their development of emotion regulation (Morris, Silk, Steinberg, Myers, & Robinson, 2007; Morris et al., 2011). The role of parents in emotion socialization extends to adolescents, and is particularly salient for depressed adolescents (Hunter et al., 2011). Moreover, given the high rate of genetic vulnerability, it is likely that many of the anxious and depressed youth in the current sample have a parent who is depressed (Eley & Stevenson, 1999; Thaper & McGuffin, 1997). Offspring of depressed parents are exposed to maladaptive strategies for handling negative emotions (Beardslee, Versage, & Gladstone, 1998; Goodman & Gotlib, 1999; Silk, Shaw, Forbes, Lane, & Kovacs, 2006). Thus, future research would benefit from exploring whether parents, including parental psychopathology, differentially impact emotion regulation in anxious and depressed youth.

5.9 CLINICAL IMPLICATIONS

Our study revealed that depression was uniquely linked with greater peak sadness and a higher proportion of family concerns, while anxiety was uniquely related to greater peak nervousness

and higher levels of worry. These features of emotionality and emotion regulation may be useful in identifying which diagnosis best captures an individual who presents with symptoms that could be attributed to either diagnosis. Lending support to this possibility, a recent review indicates that the presence of depressive symptoms in children is a good predictor of future MDD, particularly if one of the symptoms present is a core symptom of MDD, such as depressed mood (Kovacs & Lopez-Duran, 2010). In contrast, anxious symptoms were not found to be a good predictor of future MDD. Consistent with this finding, Beesdo, Feng, Hipwell, & Klostermann (2009), measured symptom development from age 6 to 13 in a large, population-based sample of females. These authors found current depressive symptoms, not anxious symptoms, to be the best predictor of later depressive symptoms. Further supporting this, Lévesque et al. (2011) completed a negative mood induction with youth at high- and low-risk for depression. Both groups reported feeling sad during the film but the youth at high-risk for depression exhibited greater activation in the left insula and right caudate nucleus, areas implicated in processing emotional information. The authors did not include youth with clinical levels of other symptoms. Yet, if Lévesque et al.'s (2011) findings can be shown to extend to a sample of youth with clinical levels of anxiety, youth's neural response to sadness could provide another means for identifying which youth are more likely to develop depression.

In addition to providing potentially unique diagnostic indicators, our findings have implications for treatment of pediatric anxiety and depression. For example, given the specific associations found between depression and family concerns, depressed youth may benefit more from treatments that include their family. In support of this, Dietz and colleagues found family-based interpersonal therapy (FB-IPT) for depression to reduce depressive symptoms in 9-12 year-olds (Dietz, Mufson, Irvine, & Brent, 2008). These authors also found reductions in

comorbid anxious symptoms in youth who engaged in FB-IPT. Yet, a recent meta-analysis revealed that CBT for anxious youth is equally effective with or without parent involvement (Manassis et al., 2014).

Additionally, emerging evidence in the adult literature suggests that both rumination and worry are related to reduced cognitive control, which hinders a person's ability to switch the focus of their thoughts (Beckw , Deroost, Koster, De Lissnyder, & De Raedt, 2013), in particular thoughts of negative valence (Koster, De Lissnyer, & De Raedt, 2013). Reduced cognitive control, in turn, may lead individuals with both disorders to engage in repetitive negative thinking (McEnvoy, Watson, Watkins, & Nathan, 2013). Thus, youth with GAD or depression may benefit from more recent treatments specifically developed to target this type of thinking pattern. For example, in a community sample of youth, Hilt and Pollak (2012) demonstrated that brief interventions teaching distraction or mindfulness successfully reduced rumination following a negative mood induction. Similar interventions have been shown to be effective in adults with MDD (Manicavasagar, Perich, & Parker, 2012; Munshi, Eisendrath, & Delucchi, 2013). These methods may have similar benefit for youth with GAD.

Finally, if future research reveals these shared characteristics to also be present prior to disorder onset, these factors could serve as indicators of youth at risk for developing anxiety and depression. Moreover, these areas might be useful targets for prevention programs, in particular for high-risk youth, for whom prevention programs have been shown to be most effective (for meta-analysis, see Stice, Shaw, Bohon, Marti, & Rhode, 2009).

5.10 RECOMMENDATIONS FOR NEXT STEPS

In light of this study's findings, the age of our participants, and the potential for a subset of youth in our anxious group to develop future depression, an important next step would be to extend this work by conducting a short-term, longitudinal study with several different age cohorts. This multi-wave longitudinal design has been utilized by Hankin and colleagues in community samples (e.g., Cohen et al., 2014; Hankin, 2008b). For instance, including youth at several different ages (e.g., late childhood, early adolescence, late adolescence) and measuring data at several points throughout one year, would enable us to better take into account the impact age had on our findings (e.g., do aspects of emotion and emotion regulation more clearly differentiate older youth than younger youth) as well as examine temporal effects (e.g., how changes in sadness affect rates of rumination versus worry). Additionally, it would be useful to apply this study design to youth at high risk for developing anxiety and depression (i.e., based on genetic heritability) to determine whether features of emotion and emotion regulation also differentiate which youth will develop anxiety versus depression.

APPENDIX A

INTERVIEW QUESTIONS ASSESSING YOUTHS' RESPONSES TO RECENT NEGATIVE EVENT, POSITIVE EVENT, AND WORRIES

Most Negative - Past Hour

Try to remember your feelings and thoughts over the past hour. Think about the time when you felt the worst, or the most negative (e.g. mad, upset, nervous, disappointed, sad, worried). What happened?

If subject says nothing say:

Prompt 1: Sometimes it helps to think about what happened over the past hour. What were you doing an hour ago? What have you been doing since then? During that time, was there anything that made you feel bad?

Prompt 2: Sometimes little things can get under your skin. Was there anything minor that happened that bugged you, like you hurt yourself, you lost something, you didn't get something you wanted, or somebody annoyed you?

Prompt 3: Was there anything that you were thinking about that may have upset you, such as feeling unhappy about something?

- | | |
|--|--------------------------------------|
| A. At the worst point, how angry did you feel? | 1=very slightly or not at all |
| B. At the worst point, how nervous did you feel? | 2=a little |
| C. At the worst point, how sad did you feel? | 3=moderately |
| D. At the worst point, how upset did you feel? | 4=quite a bit |
| E. At the worst point, how bored did you feel? | 5=extremely |

When you started feeling the worst, did you react in any of the following ways?

- _____ Did you realize that you just have to live with things the way they are?
- _____ Did you do something to fix the problem or think of a way to make things better?
- _____ Were you unable to stop thinking about how you were feeling - thoughts about [Most Negative] kept popping up in your mind?
- _____ Did you keep your mind off of the problem by doing something else?
What did you do? _____

_____ Did you tell yourself that it wasn't a big deal or try to think of the problem in a different way so it didn't seem as bad?

_____ Did you try not to think about it or try to forget all about it?

_____ Did you get a headache, stomachache, tight muscles, fast breathing, or become hot and sweaty?

_____ Did you do anything else?

Describe _____

Most Positive - Past Hour

Think about the most enjoyable or happy time in the past hour. What happened?
(e.g. happy, relaxed)

At the best point, how happy did you feel?

1=very slightly or not at all
2=a little
3=moderately
4=quite a bit
5=extremely

Worry

Tell me what you were worrying about before the phone rang.

W1

Is there anything else that you were worrying about?

W2

Is there anything else that you were worrying about?

W3

How worried were you about {worry}?

W1

W2

W3

1=very slightly or not at all
2=a little
3=moderately
4=quite a bit
5=extremely

APPENDIX B

CATEGORIES USED TO CODE CONTEXT OF NEGATIVE EVENT

- 1) **School** (*poor grade, test anxiety*)
- 2) **Sports** (*loss of competition, worry about game, does not have to be competitive*)
- 3) **Peer Concerns** (*conflict, social rejection, afraid of going to a sleep over with friends*)
- 4) **Romantic** (*crush not returned, rejected for date*)
- 5) **Family Conflict or Family Concerns**
- 6) **Boredom**
- 7) **Physical Appearance**
- 8) **Health Concerns-Self** (*chronic illness or injury-diabetes, blindness, broken leg*)
- 9) **Grieving/Loss**
- 10) **Inconvenience/Minor Irritation**
- 11) **Disappointment**
- 12) **Material** (*not enough money, can't find item*)
- 13) **Danger/Fear** (*being afraid of the dark*)
- 14) **Cessation of enjoyable activity**
- 15) **Loneliness**
- 16) **World Events**
- 17) **Having to do something you don't want to do**
- 18) **Transient Pain or Discomfort** (*bruises, stomachaches, cuts*)
- 19) **Health Concerns-Other**
- 20) **Study Related** (*e.g., being upset about missing a call*)
- 21) **Video Games**
- 22) **Treatment- or substance use- related** (*includes running out of cigarettes*)
- 23) **Time** (*e.g., not having enough time for something, running out of time, worried about time*)
- 24) **Nothing**
- 25) **Unclear/other** (*anything that is not code-able using the above codes*)
- 88) **Missing**
- 99) **N/A-question does not apply**

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